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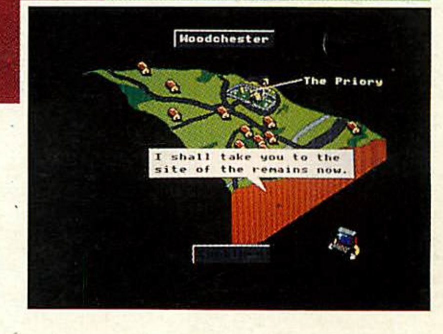


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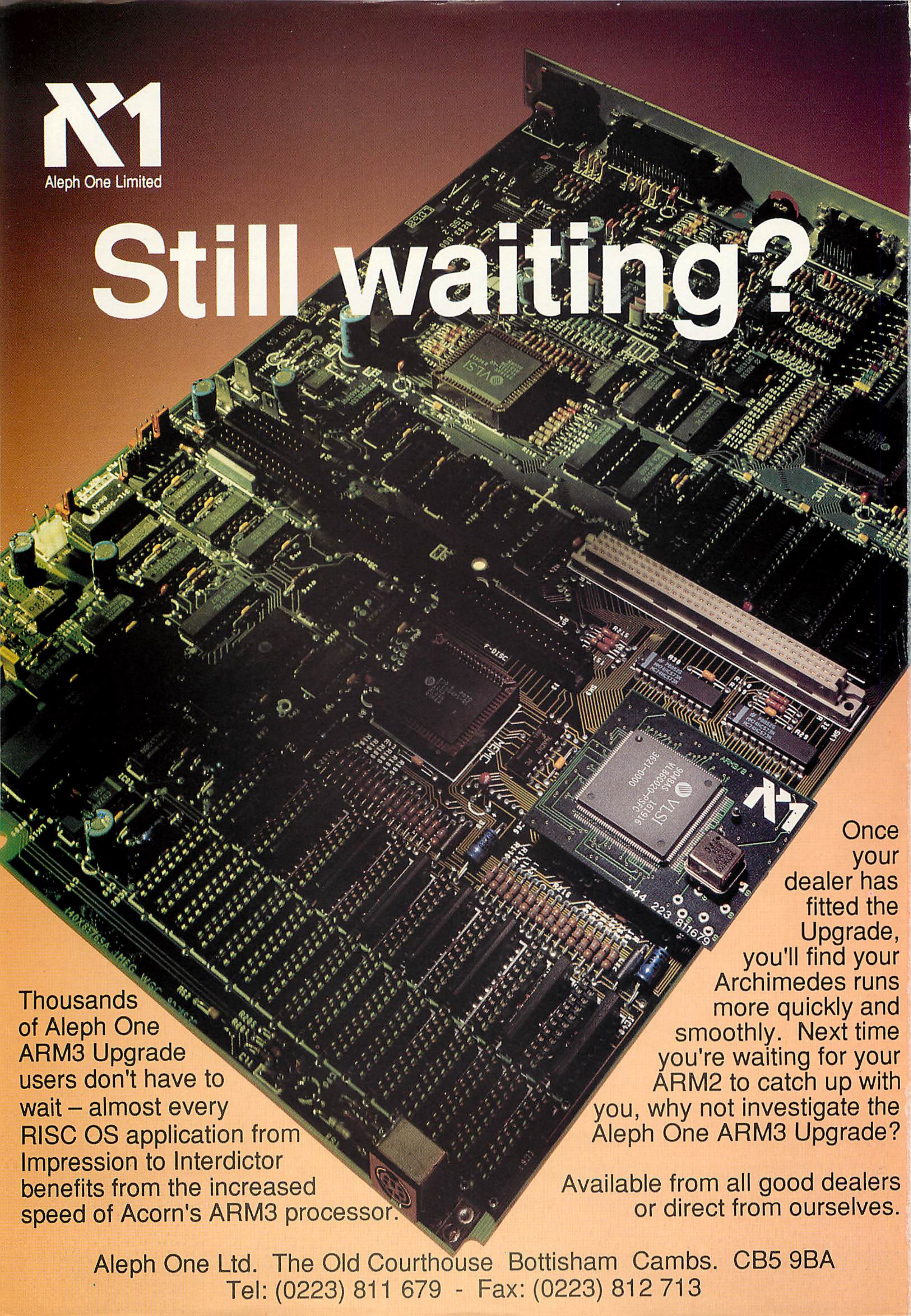
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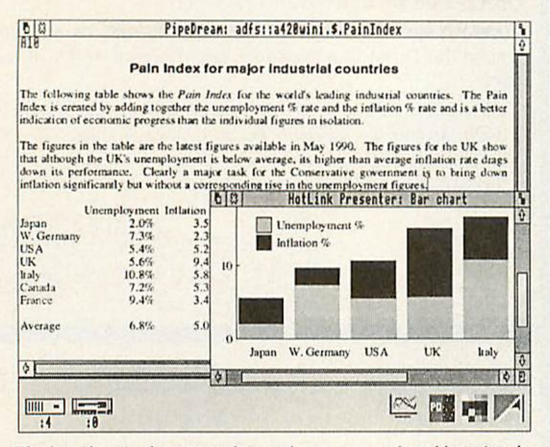
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SEPTEMBER 1991
ISSUE 110



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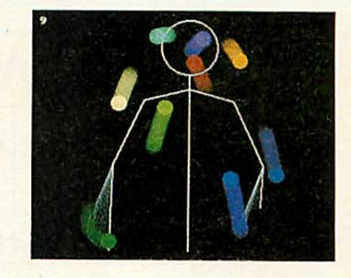
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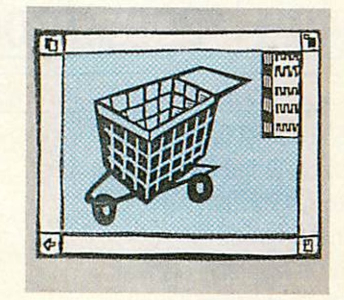
PRODUCED ON THE ARCHIMEDES

All the editorial pages in BBC Acorn User are produced on a DTP system using Acorn Archimedes 440/1 and A540 computers, Computer Concepts' *Impression 2* with Laser Direct printers and Taxan monitors

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SETTLE DOWN



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GAME SHOW





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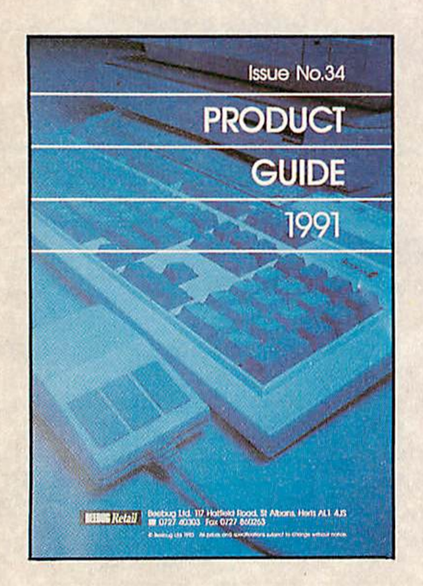
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LOW-COST SOUND SAMPLING ARRIVES

TWO low-cost digital sound sampling devices for the Archimedes have been released by both Hybrid Technology and Oak Solutions. At a glance it would be easy to confuse the two, not least because, at the time of going to press, both companies were using the same product name – Arc Recorder. It is understood that Hybrid and Oak are discussing how to resolve the confusion.

What the two samplers have in common is that they are both eight-bit devices designed to playback via the Arc's own sound circuitry. Both connect via the parallel printer port and are supplied with a microphone. They are also priced similarly – at around £30, both comprehensively undercut earlier sampler designs because they do not use the relatively expensive podule slot option. But that is where the similarities end.

The sampler from Hybrid Technology, the company known for the BBC Model B Music 5000 synthesiser, conforms to the firm's new access link bus protocol which will enable several forthcoming add-ons to be connected to the Archimedes' parallel port at the same time. There is a through connector enabling printers and dongles to be daisy-chained. An audio line-in socket is provided for direct sampling from a hi-fi source. Sampling can take place simultaneously with playback.

Emphasis has been placed on ease of use, contrasting with the complex software interfaces usually accompanying sound sampler devices. Hybrid's Chris Jordan wants to see his device used as a general-interest aid to computer users of all ages, not simply as a music sampler or technical sound analyser. A prime target is the classroom.

Samples are displayed graphically on-screen and selected samples can also be used to replace the Arc's standard audio waveforms.

Oak Solutions' device consists of a hand-held omni-directional microphone which simply plugs into the printer port. The software for Oak's device was written by Paul Fellows, author of *Genesis*. Naturally, Oak sees its sampler as being an ideal extension of versions one and two of this package. The software supplied allows samples to be recorded, played back and transferred to *Genesis II* and other Archimedes applications via the standard *Armadeus* file format.

Both the Hybrid and Oak products are set to create increased enthusiasm for sound sampling on the Arc – it will be interesting to see how the confusion over product names is resolved.

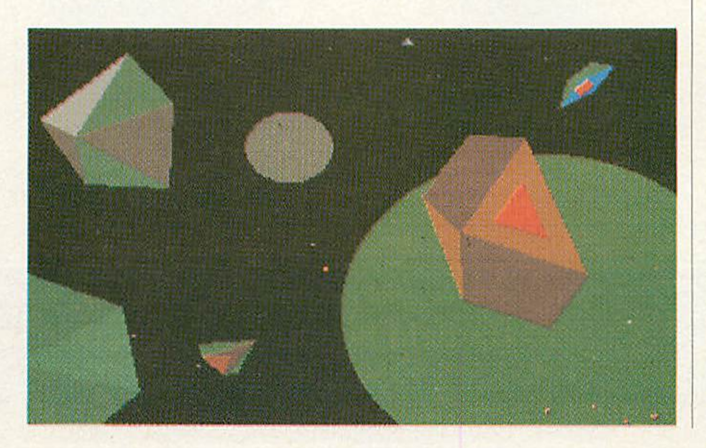
JOIN THE 'ELITISTS' AT BAU SHOW

THE Archimedes version of *Elite*, the hugely successful BBC micro game which has gathered thousands of fans since the original version was launched in 1984, will be launched at the BBC Acorn User Show at Wembley in October, *writes Mat Tizard*.

The game has been completely revised and redesigned by the new developers and incorporates all of the features of the original, plus a host of improvements.

The preview version clearly shows that existing *Elite* enthusiasts who have since upgraded to the Arc and are yearning for their favourite game to appear will certainly not be disappointed. Needless to say, with a new order of processing power the game now uses extremely fast solid 3D graphics routines which can cope with a veritable armada of ships on screen at any one time without slowing down or compromising the atmosphere of the game.

The trading component has been made easier to use and financially more realistic, and the missions you are assigned as you progress are now far more involved. Not only are the other craft you encounter endowed with intelligence, emotions and politics of their own, but they can also act on impulse – and, unlike the original, they are not above attacking each other as well as you. We could be in for a new generation of 'Elitists'.



ACORN IN TOP FIVE

ACORN Computers had the fifth largest share of the personal computer market in the UK in 1990, ahead of both Atari and Apple.

According to figures calculated in unit sales by computer industry research company, IDC*, Acorn's market share was just over six percent. Acorn's main competitor in the education market – Research Machines Ltd (Nimbus products) – was in eighth place with 2.8 per cent.

Atari was placed sixth with 5.5 percent of the market and Apple was next in seventh place with 4.3 percent.

The Apple Macintosh has never proved to be a major volume seller because of its relatively high price, but it will be interesting to see whether Apple's recent introduction of lower-cost models will boost its market share next year.

Acorn's marketing director, Mike O'Riordan, said he was pleased to see confirmation of the continuing sales growth in the Archimedes. By all accounts, Acorn sales – especially of the BBC A3000 – are holding up well despite the economic recession, which is having more effect on the near-saturated PC market.

Ahead of Acorn in the Top Five were, in order: Amstrad, IBM, Commodore and Compaq. That is impressive company for Acorn.

**IDC's estimates are based mainly on data from the manufacturers themselves.*

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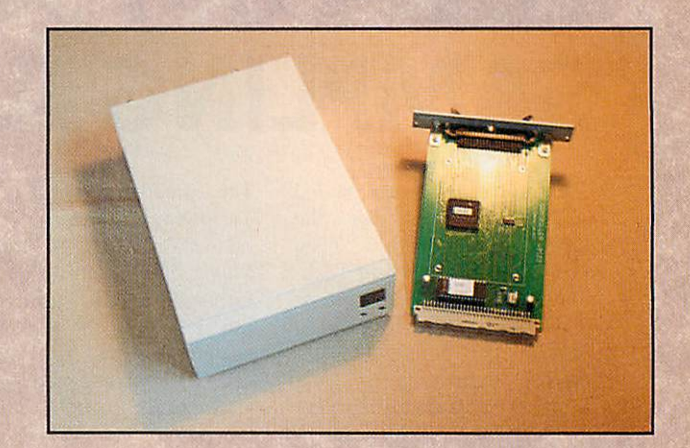
IF YOU are a software publisher, do you know that Acorn keeps an database of available software for the BBC and Archimedes machines?

If you would like your software to be considered for inclusion on the database, please contact Sue Wall at Acorn Computers on (0223) 245200 to obtain further information.

IDE Hard Disc Upgrades
for the Archimedes & A3000

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What is IDE?
IDE (Integrated Drive Electronics) is the latest interface standard for connecting hard disc drives to personal computers. Unlike previous interfaces it incorporates much of the circuitry on to the drive itself, greatly simplifying the interface electronics.



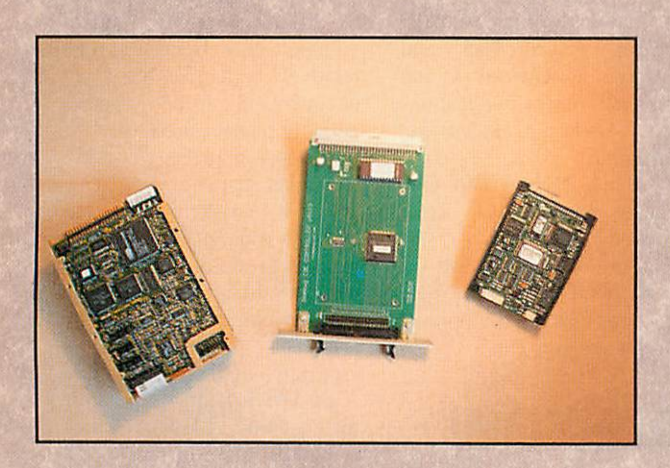
How fast is IDE?
The IDE interface uses a full sixteen bit data bus that allows very high transfer rates between the drive and computer. This coupled with cache memory on the drive itself provides for an Archimedes hard disc system that is typically 50% faster than the standard Acorn ST506 hard disc interface.

What drive options are available?
Archimedes 310, 440, 400/1 and 540.

Drive sizes currently available are 42, 89 and 105 Mbyte with a typical access time of 28ms for the 42Mb models and less than 20ms for the others.
These 3.5" drives are available as either internal or external units, and use our high speed 16 bit IDE interface card that fits in your podule backplane. External drives are attractively boxed with their own internal power supply and fan. You may even use both an internal and external drive from the same interface if required.

A3000

The external drives above are also suitable for the A3000, used in conjunction with the 16 bit interface card that fits in the A3000 podule slot. We are also able to offer internal IDE drives for the A3000 that fit into the internal podule slot. These special 2.5" dirves are available in 20 and 42 Mbyte formats and have access times of 23ms.



Will my existing software work with IDE?
The careful design of RISC OS and IDEFS, our IDE filing system, ensures that all RISC OS compliant software will function perfectly with IDE drives. Some older software may need minor changes, but these are documented in the user guide. There are no hidden catches!

Can I add additional drives at a later date?
The IDE interface can support two hard disc drives. Typically, one of these would be fitted internally, and the second unit connected externally via the expansion connector provided on each interface card.

What does the future hold?
IDE is a relatively new interface standard, but has already gained massive support. The next few months will see drives up to 400Mbyte, with larger capacities, and devices such as tape-streamers following very soon. The future for IDE is very bright indeed.

Quality
You may have total confidence in our products. Only the best drives from recognised manufacturers are used, Conner, Seagate, NEC etc. All drive kits are supplied with full fitting instructions and a user guide to ensure that you will have no problems at all. Our interface conforms fully with Acorn's IDEFS specification.

	Internal		External	
Description	***Stock Code***	***Price***	***Stock Code***	***Price***
Archimedes 42 Mb	*5251*	*£269.00*	*5261*	*£359.00*
Archimedes 89 Mb	*5252*	*£389.00*	*5262*	*£479.00*
Archimedes 105 Mb	*5253*	*£499.00*	*5263*	*£589.00*
A3000 20 Mb	*5270*	*£375.00*	*N/A*	------
A3000 42 Mb	*5271*	*£569.00*	*5281*	*£369.00*
A3000 89 Mb	*N/A*	-------	*5282*	*£489.00*
A3000 105 Mb	*N/A*	------	*5283*	*£599.00*

All prices include IDE High Speed Interface.

All prices are Ex VAT

Available from your local dealer, or directly from Beebug (please add £9 carriage).



Please write or phone for our New A4, 72 page full colour Product Guide.

117 Hatfield Road, St. Albans, Hertfordshire AL1 4JS
Tel. 0727 40303, Fax. 0727 860263

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UPGRADE PROBLEMS WITH NEW ACORN PC EMULATOR

THE ENTHUSIASM which greeted last month's release of Acorn's long-awaited new multi-tasking Risc OS *PC Emulator* could prove to be short lived for many users of the previous emulator.

Supplies of the new emulator package were still in short supply at the time of going to press and Acorn also revealed that not all *PCE* users will not necessarily be equal.

Obstacles lie in the way of those wishing to take advantage of Acorn's £29 upgrade offer. Trips to your local Acorn dealer may end in disappointment – Acorn is handling the upgrade scheme for existing *PCE* users exclusively from its Cambridge offices.

Acorn has been happy to promise supplies of the new *PCE* software for users of the old *PCE* who are registered as having bought the stand-alone package, which was supplied with Microsoft MS-Dos.

Unfortunately, customers who bought the Archimedes Learning Curve were supplied with a Digital Research DR-Dos *PCE* package and Acorn has to currently turn away users who wanting to upgrade. To confuse matters even further, some dealers have been splitting up Learning Curve packs and selling the DR-Dos *PCE* package separately – something which Acorn does not allow because of its restricted DR-Dos licensing agreement with Digital Research. Acorn says it will take tough action with any dealers caught splitting Learning Curve packs, although the practice appears to have largely ceased since a warning was issued by Acorn last year.

Why is Acorn discriminating between MS-Dos and DR-Dos? The explanation is that Quality Assurance (QA) testing had only been completed for the *PCE* when used with MS-Dos. Indeed, the complete new *PCE* package is supplied exclusively with MS-Dos at present, although the £29 upgrade only includes the Risc OS *PCE* and does not include any Dos.

Acorn clearly does not wish to take a risk in supplying its new *PCE* to all-comers. Whether its policy to rush out the MS-Dos-passed *PCE* before the DR-Dos vetting had been completed was right or wrong will surely be debated for some time.

Until Acorn is confident with the DR-Dos version, thousands of its customers must weigh up whether they should wait or shell-out an extra £75 for the full package, including MS-Dos. Meanwhile, the message from Acorn is – be patient.

NEW IRLAM SCANNER

IRLAM Instruments has introduce a professional colour scanning system for the Archimedes.

The Image Professional will include an A4 flatbed colour scanner, a podule and software. The scanner is capable of scanning up to 300dpi in monochrome, 256 grey scales or full colour. A full colour scan is said to take around four minutes and, because the data is processed and compressed during scanning, the sprite will be ready to save immediately.

The software will support a number of file formats, including 24-bit TIFF files and Irlam's own 24-bit file.

The software also has colour processing routines built in and will allow gamma correction. A further package will allow image processing and colour changes.

Contact Irlam Instruments on (0895) 811401.

ARCS KEEP ON TRUCKIN'

VISITORS to the BBC Acorn User Show in October will not fail to miss a rather large and dominant pantechnicon parked out in front of the Wembley Conference Centre. The vehicle in question (pictured below) is the latest addition to Acorn's 'range' and will be filled to the gunwales with products.

Working in conjunction with dealers, Acorn is currently putting the final touches to plans for a massive sales programme at the show, with specially trained customer care staff, low-rate finance schemes and other incentives.

The mega-mobile warehouse will be a cornerstone of the operation, ready to satisfy demand from the thousands of visitors expected to attend the show.

Watch out for more details in next month's issue.



EDUCATION DIRECTORY READY

THE UPDATED edition of the *Education Directory*, listing over 1200 educational software titles available for the A3000/Archimedes range, has just been launched by Acorn.

At 230 pages in length, the second edition features many new titles, giving information on the programs, together with price and software house details. A titles' listing takes up 10 pages and there is also a 35-page section devoted to listing all the products in categories, both under educational subjects and by generic type.

Included are over 130 maths-based programs, 70 modern languages titles and over 70 different word processing and desktop publishing packages, as well as around 100 items of interest to the special needs sector.

Acorn's education business manager, Chris Humphries, said: 'For this latest edition we have updated the database of available programs and, following the useful feedback from our customers, we have made a number of improvements in the layout to make it even easier to use'.

The directory costs £4.95 and is available from Acorn dealers. For further information contact Acorn Computers on (0223) 245200.

GOODBYE!

It is with sadness that we note the passing on of *BAU* production editor Pauline McLemon.

From obscure beginnings as temporary editorial secretary, such were Pauline's talents that she rapidly rose to a position of not inconsiderable power. She worked under all the great editors – Tony Quink, Graham Ball, Jeff Baines and, latterly, Berry Mink.

However, although as you can see, it has lost a prodcution editro, *BAU* has gained an Attic Acorn correspondent.

She never missed a deadline but we will miss her.



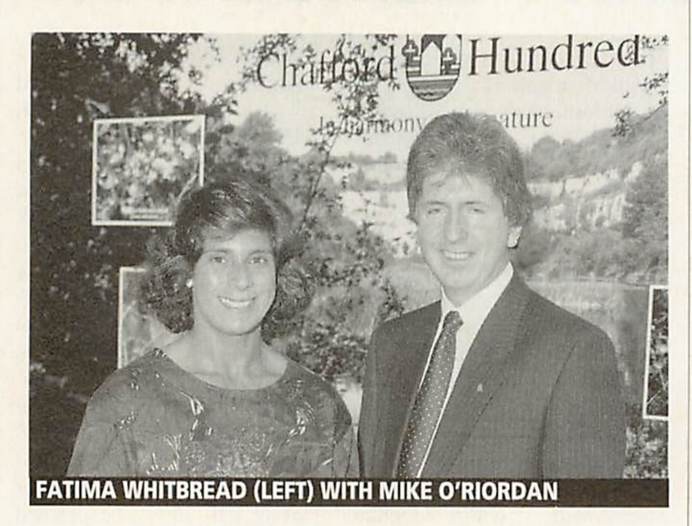
ACORN SUPPORTS SCHEME FOR YOUNG ATHLETES

ACORN has agreed to sponsor the Chafford Hundred Athletic Club, whose patron is star javelin thrower, Fatima Whitbread. The club, based in Thurrock, Essex, was set up to support and promote young up and coming British athletes, especially those who may have come from disadvantaged backgrounds.

The deal, said to be worth a six figure sum over the two-year sponsorship period, will guarantee the involvement of famous names from the world of athletics.

Stars including Linford Christie, Colin Jackson, Steve Backley, John Regis, as well as Fatima Whitbread herself, will be making personal appearances at various Acorn events. The first major event will be the *BBC Acorn User* show in October.

Acorn's background in supplying education and the Chafford Hundred cause appear to fit well together.



FATIMA WHITBREAD (LEFT) WITH MIKE O'RIORDAN

Fatima Whitbread commented: 'The technical expertise of Acorn, coupled with details of our training activities, create a combined programme that is both interesting and educationally stimulating for the country's up and coming young athletes.' She also cited Acorn's track record in special needs education.

Acorn's marketing director, Mike O'Riordan, said: 'We have a common aim – to help children attain their full potential in education and sport.

'We are therefore delighted to form this partnership with the Chafford Hundred athletes and look forward to working closely with them over the coming months.'

ECONET TESTER

HAVING problems finding and rectifying faults on your Econet network? Then Alsystems could provide you with a First Line of Attack, or 'FLAT', test box.

Designed for the absolute beginner, the FLAT box features include:

- A 'drop lead' tester to detect cable breaks and short circuits, as well as cross-over connections.
- Multimeter sockets which allow one-handed operation when measuring cable resistances.
- LEDs which permit monitoring of both clock and data signals for faults.
- A Filestore internal clock test facility.

The FLAT box costs £75 plus £2.35 p&p and is available from Alsystems, Tel: (0420) 87213.

NEWSHOUNDS ON TRAIL

SCHOOL may be over for the summer, but pupils from one Cambridge school will be gearing up for a hectic new term of activity – and making news at the same time. Pupils from St Bede's School in Cambridge are keen fans of desktop publishing and produce various newsletters, posters and other documents using ESM's Desktop Folio DTP package.

Pupils from the school will be acting as 'newshounds' at the BBC Acorn User in October, producing a show newsletter full of news and gossip from the show. So watch if you are going to the show – they could be on your trail!



NEWS IN BRIEF

● **IF YOU** are thinking of attending the BBC Acorn User Show, due to take place at the Wembley Conference Centre from October 11 to 13, then why not save money by applying for tickets now?

Prices are £5 for adults, £3 for under 16s (under fives are free) and £13 for family tickets (two adults and two children). Tickets will be available on the door at £6, £4 and £16 respectively.

Applications for advance tickets and further information should be sent to: Safesell Exhibitions Ltd, Market House, Cross Road, Tadworth, Surrey KT20 5SR.

● **CALLING** all budding software programmers. A new software house, called Papyrus Software, is planning to develop new games for the Archimedes and wants to hear from readers who would like to earn money from their talent. Contact Sholto Fisher, Papyrus Software, Craghead Cottages, Clappersgate, Ambleside LA22 9NA.

● **A HIGH** Density disc interface for the Archimedes is being planned by Arxe Systems. The product will comprise of a card which will hold the new disc controller system and a 2Mb high density disc drive.

The system has been designed to replace the normal ADFS system for floppies, and is provisionally called QuadFS. The company is looking to include additional functionality and would welcome suggestions from readers.

Contact Arxe Systems Ltd, Dept A2, PO Box 898, London E7 9RG. Tel: 081-534 1198.

● **DT SOFTWARE** has announced a two new image scanners for the Archimedes. Based around either the Epson GT-4000 or GT-6000 scanners, with a custom high-speed parallel interface to transfer images quickly into the machine, the scanners offer: 400dpi or 600dpi; mono scanning up to 256 levels of grey; selectable dropout colour; colour scanning in 3-24bpp; dithering for the modes with few colours and full Risc OS compliant software.

The prices are £1299 (GT-4000) and £1699 (GT-6000). Contact DT Software, Freepost, Cambridge CB3 7BR. Tel: (0223) 841099.

● **LOOKING** for new software? Then see our Software Showcase which starts on page 125.

The best just got better.

Introducing the new Star LC-20.

Pedigree counts.

The new Star LC-20 is the direct descendant of the LC-10. A printer whose critical acclaim was only exceeded by its popularity with its users.

The LC-20 continues the family tradition as a monochrome 9-pin printer, ideal for home users, small businesses, education and departments within major organisations.

Its solid looks tell you that this is a printer strong enough for the toughest applications.

But the LC-20 also offers you a better performance. Not only is it faster than the LC-10, you'll also find it quieter.

Its features are everything you've come to expect from Star. But the most distinctly traditional thing about the LC-20 is its price. So easy on the pocket, you just won't believe how good it is.

But then the LC-20 does come from a good family.

Star – making printers for people not machines.



A division of Star Micronics Co., Ltd., Japan

Star Micronics U.K. Limited,
Star House, Peregrine Business Park, Gomm Rd.,
High Wycombe, Bucks. HP13 7DL.
Tel: (0494) 471111. Fax: (0494) 473333.

Please share some information with me on the Star LC-20
Name
Company
Address
Postcode Tel:
Or call the Sales Information line on (0494) 471111.

HMSO

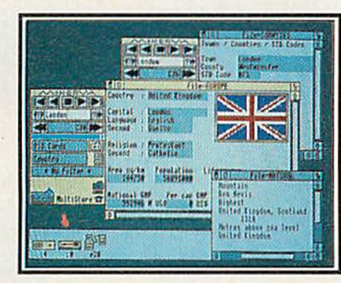
HMSO preferred.
For information, ring (0603) 695256.

Specifications: 9 pins • print speed - 45 cps at 12 cpi (NLQ), 180 cps at 12 cpi (draft elite) • 8 NLQ fonts (including italics) - Courier, Sanserif, Orator-1, Orator-2 + draft • 4kb print buffer • push tractor feed/short form tear off • paper parking.

BUSINESS EDUCATION OR HOME DATABASES

MINERVA

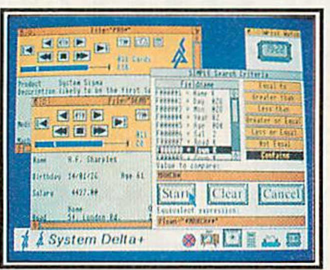




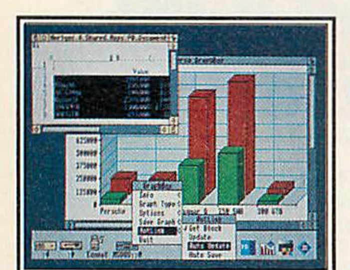
MULTISTORE The ultimate in database technology. A powerful database for the business or serious home user. MultiStore is a multi-tasking relational database which allows many database files to be opened at one time. Files may be linked so that relationships between files are automatically tracked. Rapid searches by any criteria, including 'sounds like' facility. Key fields for instant search, indices to allow file browsing in more than one order without sorting. Fast sort facility by single field or complex expression. Comprehensive reporting facilities allow any report, including totalled lists of fields, labels with multi-font capability, line trapping, justification, paging, multi-set stationery and even completely relational reports. Data can easily be exported to other RISC OS packages. MultiStore is a professional package and probably the most comprehensive database available today. **£305.50 inc V.A.T.**



FLEXIFILE The perfect database for education and small business users. FlexiFile is a new powerful multi-tasking database with friendly screen displays. Multiple files may be open at the same time with relational linking between any two files. FlexiFile allows fast sorts to be carried out and with its soundex searching allows even mis-spelt items to be found. Mathematics can be performed using the macros while indices allow you to browse the records in more than one order without performing sorts. FlexiFile lives up to its name giving the user full flexibility with ease of use. **£153.22 inc V.A.T.**



SYSTEM DELTAPLUS The database for the serious home user or enthusiast. System DeltaPlus is a comprehensive database giving you power coupled with ease of use. Easy to use video style controls and the ability to define your own card layouts make this database suitable for all types of data entry. Searches can be performed by simply selecting from within windows or by multiple criteria. Reports can be produced together with labels up to four across with blank line strip. With comprehensive maths, sorts and searches System DeltaPlus is hard to beat. System DeltaPlus may be programmed if required allowing you to customise the package or write your own applications. **£81.69 inc V.A.T.**



GRAPHBOX* **Data can be imported from the Minerva range of databases to GraphBox and stunning charts produced.**
With twenty different charts and graphs you will always be able to present your data to its best. GraphBox also imports data from other RISC OS packages. With a 'Hot Link' to Pipedream 3 which allows for automatic updating of graphs from data produced and the ability to export charts as draw files. Graph Box is the answer you have been looking for.

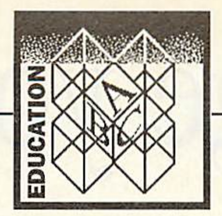
* *Graphbox is not a database, but can be used with any of the above programs for reproduction of charts and graphs.*

£81.69 inc V.A.T.





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MORE MICROS IN SCHOOLS

A DES SURVEY published last month showed an increase in the number of computers in schools, and in IT expenditure.

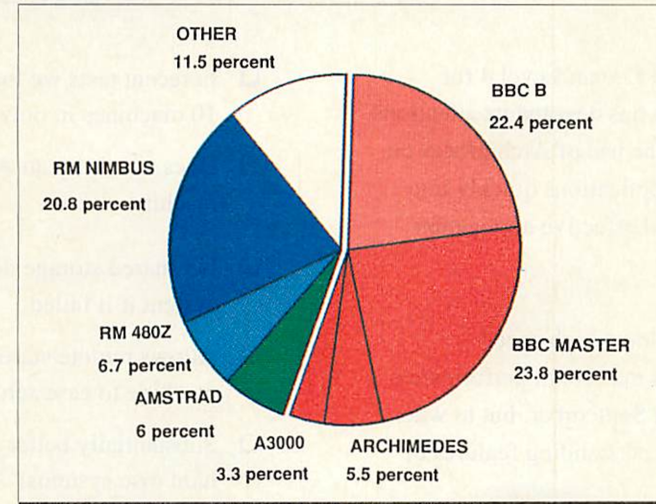
Carried out in 1990 on a representative sample of schools, the aim was to calculate the current level of provision for IT in education, and to determine its contribution across the curriculum.

There were on average four micros per primary school, and 41 micros per secondary school, compared with two and a half and 23 respectively in 1988. The pupil:micro ratio has in turn been reduced to 40:1 in primary schools and 18:1 in secondary schools.

The most commonly found microcomputers in schools were made by Acorn. This information is confirmed by an independent market research survey which found Acorn machines in nine out of every 10 primary and secondary schools. Moreover, 72 percent of LEAs recommend Acorn computers for school use, with 74 percent of schools actually buying Acorn products in the second half of 1990.

School spending on IT has doubled since 1988, with over 60 percent of the money spent on primary schools, and 81 percent on secondary schools, coming from public funds.

For most schools the LEA was the main source of technical support, as well as the most frequent source of software. The percentage of staff attending initial awareness training days since 1988 has also increased. However only 50 percent of staff across the curriculum felt confident in using IT with pupils. For more information ring 071-934 9140.



MICROCOMPUTERS IN SECONDARY SCHOOLS

SCIENCE CHALLENGE

A new series of *Science Challenge* will be broadcast on BBC 2 from 17 September, writes David Watkins, BBC Education Officer.

The ten 20-minute programmes cover science, technology and IT at key stage 2. Each week four children are set a science-related challenge, such as investigating the principles of sound and light. Two of the children then go to an island to explore the problem, the other two remaining in headquarters to research information from books, pictures and a hypermedia database stored on computer. The work of programmer Paul Vigay enables the children to access and analyse the data – maps, sounds, digitised images, video sequences, and text – in a Wimp environment.

The audiovisual link between the island and HQ is provided by computer system, using a Hawk V9 expansion card to display real-time pictures. The software could have been run on an A3000, but because of studio requirements an R140 fitted with an ARM3 upgrade and genlock was used instead. Moreover, as standard Risc OS icons are too small for classroom viewing, an alternative desktop was used.

On 18 September there is a teachers' programme, to show how the series can be used to generate ideas and stimulate classroom activities. It features a number of schools working on science projects related to topics raised in the series, focusing particularly on classroom management.

The programme will be broadcast on Tuesdays at 11.35 am so don't forget to set your video. To order the teachers' notes and a pupils' book, ring 081-746 1111 or write to BBC Education Information, London W5 2PA. BBC Schools programme information is also available on the Neris database, Tel: (0525) 290364.

MULTIPLE SOLUTION

Oak Solutions has an answer for teachers facing the problem of delivering large Archimedes applications to multiple machines via Econet.

A ClassRom, attached to each computer on the network, provides a convenient means of storing applications locally, leaving the file server free to do what it does best – serve users with files.

ClassRom resembles a hard disc in that it installs two icons on the icon bar, but one of these is a read only area where applications are stored, and the other is a read/write area for the user's temporary data. A Risc Os compliant manager's tool enables the teacher to update either area on a ClassRom, and then to use Econet to transmit a copy to other ClassRoms on the network.

The hardware does not need a dedicated master machine, and so leaves all the computers free for use. Prices start at £315 for a 20Mb ClassRom. For more details contact Oak Solutions at Cross Park House, Rawdon, Leeds LS19 6HA. Tel: (0532) 502615.

Sharon Halpern

NEWS IN BRIEF

● **QUESTION MARK** Computing has cut the price of its school version of Question Mark. The program, which computerises tests and exams, can be used on the Archimedes with a PC Emulator. It will enable teachers to save time as the computer will mark the input answers.

The new price for UK schools is £98. For more details contact QMC at 41b Brecknock Road, London N7 0BT. Tel: 071-284 3999.

● **WRITE TO SPELL** is a resource pack from Lame Duck Publishing, detailing a scheme to teach handwriting and spelling.

The teachers' notes are supported by two programs. Big Print is a simple wordprocessor with a large text style for children to copy, while Write to Spell is a flexible database that will hold letter strings and produce individually tailored spelling sheets. Record keeping sheets are also included, in line with National Curriculum requirements.

The pack costs £16 from Lame Duck Publishing, 71 South Road, Portishead, Bristol BS20 9DY.

● **IDENTIFICATION,** Interrogation and Field Work are the three sections that make up Hedgerow, a software package to help pupils at key stages 2, 3 and 4 explore the vegetation in their immediate environment. The accompanying activity pack contains teachers' notes, worksheets and photocopiable masters.

Available for BBC B and Master computers the software costs £16.75, and the activity pack £7.75. For more details contact Mercury Educational Products, 8-10 Lower James Street, London W1R 3PL. Tel:071-287 5060.

● **EMR'S** Computer Music Learning Centre offers an opportunity for teachers to gain practical experience of its music software and hardware before using them in a classroom environment.

A range of tailored courses are available, focusing on hands-on teaching of Studio 24 Plus, the MicroStudio program and the Arpeggio Music System. The centre caters for classes of up to six – this can be six teachers or five pupils accompanied by an adult.

For more information contact EMR CMLC at Suite 2, 50 Hamlet Court Road, Westcliff-on-Sea, Essex SS0 7LX. Tel: (0702) 348406.

CONTROLLING YOUR OWN

As revealed in previous columns the BBC is an ideal computer to control a BB, especially as you can now pick up second-hand BBCs for as little as £50. Add a hard disc and a modem and you are ready to start your own BB.

There is now a new host system for the BBC available. Joel Rowbottom's *JoelBBS* has been written to help fill a gap in the BBC software market, providing a cheap and comprehensive bulletin board host system for the BBC.

For £25 *JoelBBS* offers full support of viewdata and true Ansi. At this price it should get the competition seriously worried. The file transfer section of *JoelBBS* has been closely modelled on Hugo's *ArcBBS*, and provides full support of XModem, XModem-1k, YModem and CET.

These routines were written by fellow comms enthusiast Gareth Babb and are supplied on Rom for speed and memory. *JoelBBS* supports over 50 different frame variables for viewdata access, together with code to enable you to run your own online auctions, world clock and online frame editor. Full message facilities, downloading and frame view capabilities are all included.

The scrolling system will also display *ArcBBS* menus and textfiles. It even takes into account the enhancements added by Ansi, and allows the user to choose their terminal from VT52 or VT100. Again full menu variables are supported, and full file transfer and message-conferencing is catered for. You can link into external programs, and a number of enhancements will be added over the next few months.

JoelBBS will run on any BBC B or Master 128 but it does require a minimum of 16K of sideways Ram to hold the Rom image, and a Winchester disc, minimum of 5Mb. However do shop around as hard discs can be picked up surprisingly cheaply at computer shows and amateur radio rallies around the country.



CHALLENGING DOWNLOADS

A cheaper alternative to *JoelBBS*, featuring a scrolling environment but without the file transfer protocols and message systems, will be available for £10 – which is ideal for use in schools.

To find out more about *JoelBBS* contact Mad Rabbit Systems at 22 Oakwood Grove, Near Wakefield, West Yorkshire, or dial their viewdata service on 051-339 9166.

THE CHALLENGE

This month's bulletin board is called The Challenger. It is run by Richard Whitehand and located in Birmingham. Richard claims that it is one of the fastest viewdata boards around, and as it runs from an Opus Challenger Ram disc this claim may not be far wrong.

It has numerous computer specific areas, including coverage for Archimedes and BBC owners, as well as areas for PC, Commodore and Atari users, so you can see what the competition is up to. Large selections of downloads are available for both the Arc and the Beeb, under headings such as Ample files, games and utilities.

In addition numerous message areas allow you to swap views and comments with other users, as well as to place For Sale and Wanted adverts. There are also some nicely drawn viewdata frames.

The system as a whole is easy to find your way around, and is simple to use. Challenger BBS is on 021-445 3919 and is open 24 hours a day.

TOP OF THE RANGE

Miracom, famed for its WS and Courier range of modems, has produced two new models to add to its Courier range. The 2400Plus offers v22bis (2400/2400) and the 14.4Plus offers everything up to v32bis. Both include MNP4+5 protocols, together with v42/v42bis error correction and compression. V25bis commands are also supported. The models cost £895 and £495 respectively. For more information contact Miracom on (0473) 233888.

USING THE PCE

A number of people have asked if PC comms software can be used under the PC Emulator, and the answer is yes. Any IBM AT modem cable should do. However, in case you can't find a lead I have listed the appropriate wiring in the table below.

Paul Vigay

Arc 9-way	Modem 25-way
1(DCD)	8(DCD)
2(RxD)	3(RxD)
3(TxD)	2(TxD)
4(DTR)	20(DTR)
5(Ground)	7(Ground)
6(DSR)	6(DSR)
7(RTS)	4(RTS)
8(CTS)	5(CTS)
9(RI)	22(RI)

NEWS IN BRIEF

● **WITH MANY** users now using Mercury, the following tip may help ArcTerm7 users to implement Mercury codes into their dial strings. Select Prefix from the options menu and choose a prefix. Then enter the code as follows: 131 , 123456 7890. 131 will get into Mercury's network, and a comma makes the modem wait for a Mercury line. The following six digits and four digits are part one and two respectively of your Mercury number. Press RETURN to enter this data. Then all you have to do is modify your dialstore entry to use the required prefix.

● **DARCWORLD BB** has a new fast modem so that it can be accessed at all speeds up to 9600 (v32) with MNP5. As a consequence 12/75 (v32) is no longer supported. DarcWorld BB is on (0867) 577724 and runs on Hugo's ArcBB.

● **A NEW BB**, Architype, situated in Jersey, is the only Arc based BB in the Channel Islands. There are not that many files and messages yet, so log on and say hello on (0534) 54032, scrolling 8N1.

To attract users the sysop is giving the first 30 new users special privileges, such as a greater upload/download ratio.

● **A NEW** version of David Pilling's Risc OS Terminals Plus disc is available for £17.97, £11.98 if you upgrade from older versions. For this you get Kermit and Zmodem transfers, with an accurate VT220 emulator. Viewdata and Ansi are also catered for. Contact David Pilling at PO Box 22, Thornton Cleveleys, Blackpool FY5 1LR.

● **THE LATEST** version of Anthony Frost's ReaderS utility is now available. Tentatively called version 1.00S, there are a number of bonus utilities on the disc. You can browse through and prepare off-line replies to BB messages and Canaries, and it will add a random fortune cookie to your signature line. As ReaderS is Shareware, the RNLI and Cornwall Air Ambulance service will benefit from each sale. So far £180 has been raised. It costs £10 from Anthony Frost at 10 Whiterocks Park, St. Anns Chapel, Gunnislake, Cornwall PL18 9EF.

● Procrastinet BB has closed due to unforseen circumstances. However James Coates, the sysop, is setting up a new system on a new number. Watch this space for more information.



SAMPLER MAKES WAVES

HYBRID TECHNOLOGY has released ArcRecorder, a new sound recorder for the Archimedes that provides full eight-bit sampling. It uses an eight-bit converter, although another four bits are used to provide automatic level control.

Roughly the size of a dongle, it plugs into the printer port, although it does have a through socket so that you can still use your printer. The package has been designed for ease of use, and automatically performs many of the tiresome operations, such as removing leading silence, that are done manually on other samplers.

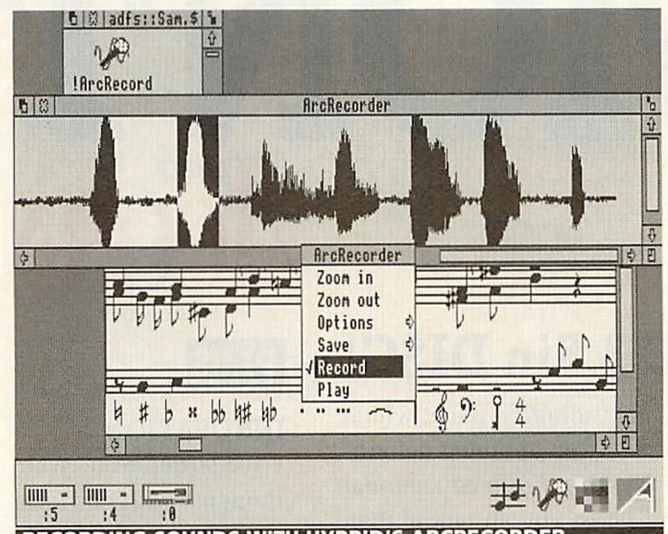
The number of controls is kept to a minimum, and the program operates in a continuous state of recording. It isolates each sound as it is recorded, and samples can be saved and then converted into relocatable modules to use in any Arc program which supports them.

It's likely that a full edit package, incorporating many of the simple-to-use features, will be developed to allow users to tweak their samples.

ArcRecorder is not aimed primarily at the musician but at all users who wish to experiment with sound. It should therefore find a home in education, for sound experiments, and Hybrid hopes that third party developers will use it for programs such as voice recognition and voice mail.

The package, including a microphone and desktop stand, costs £29.95 plus p&p. It is due for release later this year. For more information contact Hybrid Technology, 88 Butt Lane, Milton, Cambridge, CB4 6DG. Tel: 0223 861522.

● *Oak Solutions has now also released a low-cost eight bit sampler called ArcRecorder. See page seven to resolve the confusion.*



RECORDING SOUNDS WITH HYBRID'S ARCRECORDER

INSPIRATIONAL

As I revealed in July's column, *Inspiration* has been updated to version 1.03. The version reviewed in March *BAU* was 1.12, so presumably these numbers have been downscaled. If you buy it make sure that you get the latest version.

The good news is that most of the bugs have been fixed, leaving a more stable program. But it can still fall over – I tripped it up in the toolbox and the editor – though this is usable, which the earlier version wasn't. The transport and timing functions have been improved, and there are some sample tools to try, such as velocity increase, after-touch delete, velocity invert, and fade out.

It runs on any Arc without the need for the laborious configuration program, but though it can run in 1Mb of Ram this is not really enough – 2Mb is the real minimum.

Inspiration now saves Midi files, its natural file format, with the correct filetype. If you have some early version files you can convert them by altering the filetype from the desktop environment:

```
*settype <filename> fd4
```

You still can't edit the event list directly, and the documentation hasn't been updated. There is a rumour of a tutorial, although this rumour has been around for nine months!

Files still can't be saved in *Maestro* format, although this option is probably redundant now. It allowed you to view the file in music notation form but not to print it out, whereas *Rhapsody* does both, and can also load files in Midi format.

The update is free to registered users, and a demo disc is available if you send a formatted disc and p&p. For more details contact *Inspiration*'s Help Line which is being run by Sound Proposition, 44 Udney Park Road, Teddington, Middlesex, TW11 9BG. Tel: (0273) 725536.

ANOTHER LANDSCAPE

Another Landscape by John Bartlett is an Ample album release. Containing nine pieces, including *Rider in the Storm*, *Dawn*, and *Dusk*, it tells a simple story. Make up your own mind, but it seems to me that the underlying concept is not unlike Beethoven's *Pastoral Symphony*.

Rider in the Storm contains some of the best storm sounds I've heard on the Music 5000, and the other pieces invoke their own atmosphere. Each note and beat has been lovingly chosen, and placed for maximum effect.

The only thing I don't like is that the program automatically looks to drive 0 for the disc which is where I, like most people, keep my system disc.

It costs £3.95 from J B Software, 20 Crawley Avenue, Wellingborough, Northants NN8 3YH. Tel: (0933) 675392.

Ian Waugh

NEWS IN BRIEF

● **HYBRID TECHNOLOGY** has now released the Music 6000, and I have a review instrument on my desk. With its flexible goose neck and ultrasonic sensor it's reminiscent of the Martians in the War of the Worlds! Originally designed for users with special needs it's also absolutely amazing fun!

The ultrasonic sensor mounted on the top detects movement and converts it into sound. At its simplest it can play an upwards arpeggio when you walk away from it and a downwards one when you walk towards it. You can even use it to do Jean-Michel Jarre laser harp impressions!

More details in Acorn User soon. To contact Hybrid see main news.

● **PANDA IS** having a sale, offering three for the price of two on its full range of Panda Music discs. That's £6 for one, or three for £12. There are 16 discs for the Music 5000, three for the Music 500 and three for the Island Logic Music System. The offer lasts until Christmas 1991. For a list of all the tracks on the albums send an SAE to Panda Discs, Four Seasons, Tinkers Lane, Brewood, Stafford, ST19 9DE.

Panda Discs was launched to make Ample music available to a wider public. It's an offshoot of Ample DCT, a Viewdata BBS full of Ample programs, hints and tips. Log onto it on (0384) 239944 – it's well worth a look.

● **AS WELL AS** providing support for Inspiration, Sound Proposition is developing support modules, including a Track Save routine and an Arpeggiator. For more details see the address in the main news.

● **ALPINE** Software has released UltraSonic, a sound program aimed at games and demo writers. It runs on the Arc/A3000 and is fully Risc Os compatible and multitasking. It can handle four channels of stereo sound and support 32 instrument sounds.

The pack includes a program to convert samples from various formats including Armadeus, Multipod and SoundTracker, and there is a PD playback module to blend sound effects with background music. Documentation is included to show you how to produce music from Basic. It costs £30 from Alpine Software, PO Box 25, Portadown, Craigavon BT63 5UT. Tel: (0762) 342510.

NEXT MONTH

BBC ACORN USER

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Chris Drage looks at how you can use computers effectively to manage classroom activity

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We look behind the scenes of this popular education programme to find out how the Arc is being applied

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SHOW PREVIEW

This year's BBC Acorn User Show offers some exciting prospects for Arc and Beeb users. Read all about the exciting happenings at the show in our exclusive preview

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£15 STAR LETTER

I am prompted by the note in the Acorn Customer Hotline (*BBC Acorn User* July 1991) about using the PC Emulator for Open University courses, to reassure any other Archimedes or A3000 owners (or prospective purchaser) who may be thinking of taking an OU course.

I have been using the emulator this year for an OU course, and have found it perfectly satisfactory so far. However disc accessing operations seem to be slow and disc formatting is painfully so. It takes over three minutes to format and verify a Dos disc, and over 6 minutes for a P-system disc as used on my course, Fundamentals of Computing – M205. Fortunately the course does provide ready formatted discs!

Alan Beasly
Bexhill-on-Sea

A reason why your disc drive may seem slow is that you are using an old version of the PC Emulator. The latest versions now take account of the Step configuration of the floppy drive, which denotes how many milliseconds the disc takes to access the next track. For the internal drive this can be set to 3, by typing *Configure Step 3, which is the fastest. An external drive may need a slower speed. You can set this up separately. See *Configure Discs, and *Configure Step in your user guide for more details.

LOADSAPROGS

I was surprised by the letter in the August 1991 edition of *BBC Acorn User* from S J Elliot expressing concern over the lack of software for the Archimedes and A3000 computers.

Undoubtedly this was the position twelve to eighteen months ago, but the position has changed dramatically since that time. As my sphere of concern is with education, I will focus on this area, but similar statements apply to other areas as well.

The second edition of our Education Directory released last week lists over 1,200 educational software titles specifically available for the A3000 and Archimedes range of computers. Comparison with similar directories for other manufacturers, including Apple, Commodore and MS-Dos computers clearly shows that the software available for Acorn systems is more than comparable with both the range and quality of software for other systems.

At 230 pages in length, and with over 130 Maths-based programs, 70 modern languages titles, and over 70 different wordprocessing and desktop publishing programs out of the hundreds of listed titles, this directory testifies to the extraordinary productivity of the more than 300 UK software houses that produce titles for the A3000 and Archimedes.

S J Elliot also expresses concern that there is insufficient new and innovative software under development for Risc OS systems. I would first point out that of the twelve annual Educational Technology awards made at the BETT shows in January 1990 and January 1991, eleven of the twelve awards were made to packages for Acorn computers, with only one going to a package only available for MS-Dos computers. No awards were made to software packages for other manufacturers systems.

Major new innovative developments continue, with at least fifteen new or about to be released packages on show at the Access IT conference for teachers at the beginning of July. And the majority of the new developments by these software houses will be available either only or first on Acorn Risc Os computers.

On the question of games, there are now more than 130 games available for both the A3000 and Archimedes, with major software publishers such as Domark, Virgin, Fourth Dimension, Minerva and Alien Images, all launching new 32-bit titles for Acorn computers in 1991.

I can only assume that S J Elliot has not been able to obtain a copy of the first edition of our Education Directory, which sold out of its 10,000 initial print run in just over four months.

Finally, if there are any major areas of new software development which S J Elliot believes should be available for Acorn systems, we would welcome hearing about these directly, so that we can feed such ideas into our developers for their consideration. It is quite likely that many of the suggested ideas will already be under development for Risc Os.

Chris Humphries
Acorn

ACORN DOWN UNDER?

We have recently purchased 10 A3000's and have linked these with the existing 20 BBC Model B machines in a network providing a total of 30 stations. Unfortunately the Australian software market doesn't support the Acorn machines as well as it should and many old BBC retailers have fallen by the wayside.

Consequently I am searching for assistance from High School teachers and enthusiasts alike to supply some inexpensive software for both computers. After just spending $25,000 on computer upgrades in the hardware department it leaves us with a small budget for software. The areas of particular interest are science and maths, simulations, music, adventures and teacher created software.

A final point: are there any schools in the UK that would like to be linked through either disc/postage or modem to our school in Australia?

Patrick Carswell
Chanel College
11 Patterson Street
Gladstone
QLD 4680
Australia

We are sure there are many teachers out there who have been in the same situation. Maybe you have some suggestions for Patrick? We are also sure there are many software houses that wish to bombard Patrick with information sheets about their products, to show that Australia isn't that far away after all.

Look out next month for a special article on how to organise your classroom, and budget your school's computer spending.

TANDY TROUBLE

I am writing in response to the letter from R Howitt of Windsor published in the July issue.

I have a Tandy DMP200 operating successfully with a BBC Model B. I found I had to make up a special printer lead, as it seems the DMP200 is not quite Epson compatible.

The problem lies with the acknowledge line. This is normally pin 10 on the 36 way Centronics connector and is wired to pin 19 on the BBC's 26 way connector. By tracing the internal circuitry of the printer, and some experimentation, I decided that the signal is the logical inverse of what the BBC requires. Pin 11 has the correct polarity though.

The solution is to wire pin 19 at the BBC end to pin 11 at the printer end, leaving pin 10 unconnected. I used a solder terminal type of centronics plug and made all the other connections as shown on p406 of the BBC Micro user guide. It should be fairly straight forward though to fix up your old lead with a razor blade.

I don't know whether the same is true of other Tandy printers. Is it a cunning stratagem of Tandy to force owners of Tandy computers to buy Tandy printers?

Robert Stockton
Didcot

LINE UP

Contrary to both the supplied user guide and optional programmers manual, the Canon BJ10e printer does appear to support the ESC "]" reverse linefeed command.

Sending VDU 1,27,1,93 in either IBM X24E or Canon BJ130 emulation mode will reverse feed the paper by the currently selected linefeed pitch. It goes backwards the same amount that it goes forwards on receipt of a linefeed.

Paul Corke
Harleston



QUESTIONS AND ANSWERS

Q When I press function key F12 from the Desktop in order to access the command line interpreter (CLI) I am a little confused as to the best way to return to the Desktop. Typing *DESKTOP does not do the trick. all I get is a blank window on the screen. What is the correct way to get back to the Desktop please?

Alan Watt
Nottingham

A The quickest way to return to the desktop from the command line interpreter is to simply press RETURN at the star (*) prompt. This will take you straight back into the Desktop. Typing *DESKTOP will return you to the desktop, but will need an extra press of the RETURN key. This is because the *DESKTOP command expects you to put another command after it.

Q I keep reading and hearing about SID. I know it is nothing to do with the privatisation of British Gas but something to do with information about the BBC range of computers. Can you tell me more? I have an Archimedes, a modem and comms software.

A SID stands for Support Information Database. SID is an on-line database available on its own dedicated telephone line or through a gateway from Prestel. Anyone with a modem and appropriate communications software can access SID. You can dial up SID straight away on (0223) 243642. The database is in viewdata format on standard V23 protocol (1200/75 baud, 7 bits, even parity, 1 stop bit). As you would expect, all material on the system is exclusively for users of Acorn micros. It is a good place to look for PD software.

Q I have been recently purchased a second-hand modem to use with my BBC Model B computer. As you may expect, the modem had no instruction manual and the chap in the shop was unable to give me any real operating instructions other than 'I expect you just connect it up to a computer and it will go!' I'm convinced I have a bargain but the only information I really have is that the modem is manufactured by GEC Information Systems. What help can you offer?

John Yeaman
Dundee

A GEC has made a number of modems suitable for the BBC micro over the last six years, some of which have been badged by other companies. One of their popular own make modems was the DataChat 1223 which had quite a following with BBC users.

It is a good idea for you to contact GEC Telecommunications Ltd at PO Box 53, Coventry, CV3 1HJ giving them the fullest details of the modem. If possible sketch the front panel and check if there are any references on the printed circuit board you can quote.

As an introductory text you may find *The Communication Guide to the BBC Micro: The Hacker's Handbook* by Geoff Wheelwright and Ian Scales, published by Longman, ISBN 0-582-91614-3 an ideal book to get you going.

Q I am more used to desk top publishing on Apple Macs and IBM PC machines than I am on the Archimedes. I have now been using the Archimedes for a month for a freelance publishing task and I am already convinced that packages like *Impression* are tremendously powerful.

However I do get a little bit confused over the use of different names for outline fonts rather than their Postscript ones. Can you provide a list of their equivalents.

Tom Senior
Poole

A The Electric Font Foundry publishes an extensive list of the Postscript equivalent names of their fonts. This can be obtained from EFF, Bridge House, 18 Brockenhurst Road, Ascot, SL5 9DL.

Here is a brief list of Acorn, Computer Concepts and Beebug outline fonts and their Postscript equivalents.

Corpus	*Courier*
Trinity	*Times*
Homerton	*Helvetica*
Newhall	*NewCentury Schoolbook*
Selwyn	*Zapf Dingbats*
AvantG	*AvantGarde*
Pembroke	*Palatino*
Vogue	*AvantGarde*
Paladin	*Palatino*
SwissB	*Helvetica*
SymbolB	*Symbol*

Q I know the concept of filetypes is very important in the Risc Os environment and I understand it is how Risc Os knows what to do with a file when you double click on its icon.

I am familiar with what the manual has to say about setting filetypes but I am convinced that there must be an easier way. Is there?

Bill Pringle
Street

If you have a particular problem with an Acorn micro, commercial software or a program you are trying to write yourself, then BBC Acorn User might be able to help. The BAU Post A Problem service guarantees to give you a personal answer to your problem within 10 working days – and for just £4.
Write out your problem with as much detail as possible and, if a program is involved, include a disc or cassette. Fill in the coupon and send it and your problem along with a cheque or postal order for £4 (including VAT) made out to Redwood Publishing. If you require recorded delivery, please add the cost of this.
Please note that debugging readers' own programs or those from other magazines is a complex task and we cannot guarantee to give a full solution. Unless the problem can be spotted quickly, the Post A Problem service will only be able to make general comments.
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I enclose a cheque/postal order for £4 made out to Redwood Publishing and an SAE with my problem.

Office use only : Date in...........Date Out...........Reference...........

A **What you obviously need is a small utility program that enables you to set filetypes from the desktop. One such program called *Filetypes*, is available on Beebug's PD software library disc 28.**

Once loaded on the icon bar you click Menu over *Filetypes*'s icon and enter a file type number or name. An icon representing the file type will appear on the icon bar and if you drag a file to one of these icons, its file type will be set to that of the icon.

If you drag a file to *Filetypes* itself, then its file type will be used to create a filetype icon.

Q I am considering selling my unexpanded BBC micro Model B. I believe it is an Issue 1 board and it still has the original operating system 0.1 and Basic 1 installed. I would be interested if you could give me your opinion as to its value.

O F Suleman
Manchester

A **It is not easy to give a value for your machine without examining it. However some points about your machine in comparison to the normal machines offered for sale are well worth considering.**

Your system has not been upgraded to the standard operating system which is now version 1.2. It also still has the original BBC Basic. The standard language is now Basic 2 for BBC model B machines.

The final issue of the BBC Model B was Issue 7. Your machine is also without the circuitry for disc operation and does not have the DFS chip installed.

After examining the second-hand section of a number of magazines I have established that a reasonable condition BBC model B with an issue 4 board and DFS installed should fetch about £150. On the other hand a good condition BBC Model B with an issue 7 board and DFS would be worth anywhere from £180 to £200.

Q I really thought wordprocessing was going to be the answer to all my letter and report writing problems. I am finding that with the BBC micro, an Epson FX printer and the *View* wordprocessor program I am encountering more problems that I can reasonably cope with.

For a start I just cannot get bold printing and I cannot get the underlining to work. I know the printer can perform these things but my computer and its current wordprocessor can't or won't!

M C Whitcroft
Bath

A **To obtain special effects like bold and underline with the *View* wordprocessor you need to have loaded a special program called a printer driver.**

The official Acornsoft driver can be obtained from any Acorn dealer and it does include an easy to follow manual.

Over the years *BBC Acorn User* has published a large number of suitable printer drivers, one of which will meet your needs.

Q I'm looking for a piece of software that will enable me to create font effects like text in circles. I want to use them when undertaking DTP work on the A3000. Is there a package that does this automatically?

Paul Spencer
Bearwood

A **The best font effect program on the A3000 is probably *FontFX* published by DataStore Software, 6 Chatterton Road, Bromley, Kent, BR2 9QN.**

It costs £9.95 and allows text to be scaled, rotated, sloped at a specific angle, and arranged in an arc, circle or column.

It is also possible to use *FontFX* to add a shadow behind or below the text, add an outline to the letters and choose different colours. Other sources of font effects are Ian Copestake's *Drawbender* and *Poster* from 4mation, both of whom advertise regularly in *BBC Acorn User*.

ACORN CUSTOMER HOTLINE

A number of people who purchased BBC systems many years ago also purchased Epson MX 80/100 printers. The following information will enable you to change the *PrinterDM* application supplied with the Archimedes and BBC A3000 to drive the MX series correctly.

Make a copy of the *PrinterDM* printer driver application on a new disc. Do this by formatting a blank disc and dragging the *PrinterDM* application from the window for your applications disc to the window for the new disc. Now load the *Edit* application, which you will need to alter the settings inside the printer driver application.

Hold down the SHIFT key and double click on the copy of the *PrinterDM* which will open a window showing the files that form the application. The file PrData is the one that needs to be altered, and this can be dragged to *Edit*'s icon. The PrData file is designed to be readable by both humans and the PrinterDM program and you should be able to locate the settings for various types of printer. There are 13 printer types supplied as standard and we will add a further two by entering the attached text at the end of the settings and before the line 'Page Size Settings'. When you have done so save the PrData file.

You can now start your new *PrinterDM* by double clicking on its icon. When the driver is loaded click select once on its icon on the icon bar. This opens a small window which displays the current driver setting, and clicking on the printer name will cycle you through all 15 possible printer types, and do so until you reach the MX drivers. You may wish to choose save settings from the menu on the printer drivers icon, so that the driver will automatically start with the MX driver selected. The file is too wide to print here so the end of a line, is denoted by a ¶ character, when you see this character do not type it, but press RETURN.

printer_name: EPSON MX compatible (72 by 72 dpi)¶
printer_number: 13¶
pxres: 72¶
pyres: 72¶
pxres_halftone: 72/4¶
pyres_halftone: 72/4¶
dump_depth: 8 ; 8 pin¶
line_prologue: "<27>K"¶
line_epilogue: "<27>A<0><13><27>A<8><10><27>2" ; move down 8/72 inch¶
job_epilogue: ""¶

....

printer_name: EPSON MX compatible (144 by 72 dpi)¶
printer_number: 14¶
pxres: 144 ; dots per inch¶
pyres: 72¶
pxres_halftone: 144/8¶
pyres_halftone: 72/4¶
dump_depth: 8 ; 8 pin¶
line_prologue: "<27>L"¶
line_epilogue: "<27>A<0><13><27>A<8><10><27>2"¶
job_epilogue: ""¶

....

We often receive requests for further information from people wishing to design and build interfaces and peripherals for their own use, or as part of a design project. There are many suitable books that can be used in conjunction with such projects.

The two most suitable ports on the BBC B/B+ and Master 128 are the user and analogue ports. There is a discussion of the use of these ports and how to write software that reads and writes to them, in The New Advanced User Guide by Dickens and Holmes published by the Cambridge Microcomputer Centre. Farnell Electronic Components and RS Components both list suitable book titles in their catalogues. Specific BBC based titles such as Interfacing with the BBC Micro will probably be of use.

It is possible for the mouse supplied with the Archimedes and A3000 computer systems to be used with the PC Emulator. This requires your Dos disc to contain the file mouse.sys.

It is normal for any Microsoft package to include a mouse driver. If you do not have this file you will have to copy it onto your own Dos disc.

Once you have the file on your Dos disc you will have to amend the config.sys file with the following line:

device=mouse.sys

If you are unsure of how to do this the instructions are on page nine of the PC Emulator booklet.

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ABBREVIATIONS

Ace	Ace	Col	Colton	Mit	Mitre
Aco	Acorn	ComT	Computer Tutorial	Min	Minerva
Apr	Apricote	Dat	Data Store	Oak	Oak
Arm	Armadillo	Eiz	Eizo	Pil	David Pilling
Arn	Arnor	Emr	EMR	Ser	Serial Port
Arx	Arxe	Gra	Graphics Factory	Sil	Silicon Vision
Aut	Autodesk	Hum	Human-Computer	Sim	Simtron
Bai	Baildon Electronics	Ico	Icon Technology	Spa	Spacetech
Bee	Beebug	ICS	Ian Copestake	Sta	Star
Cal	Calligraph	Ife	IFEL	Sup	Superior Software
Can	Canon	Iot	Iota	Tec	TechSoft
CC	ComputerConcepts	Irl	Irlam Instruments	Wil	Wild Vision
Cha	Chalksoft	Kad	Kador	4ma	4Mation
Cir	Circle	Lin	Lingenuity	4th	Fourth Dimension
Cit	Citizen	Lon	Longman Logotron	Ð	Draw format
Cla	Clares	MicP	Micro Power	Þ	Paint format
		MicS	Micro Studio	✓	On special offer!
		Mid	Midnight Graphics		

BBC / MASTER / ELECTRON SOFTWARE

BET Basic Editor and Toolkit		
– rom module	ICS	£19
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Spellmaster rom	CC	£52
Wordpower	ICS	£36
– site licence (extra)		£100
– extra rom		£7
– extra manual		^{V0}£7

ARCHIMEDES SOFTWARE

If it's not on the list, please ask for a quote. We will always try to match the best prices.

ABC Basic Compiler	Oak	£73
Accounts	Min	£243
ANSI C Release 3	Aco	£124
Apocalypse	4th	£23
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Problem: Write a RISC OS desktop application that opens a window when select is clicked on the iconbar icon. The window must contain an icon with a border and the word 'Beep' inside it. The computer should beep when the mouse is clicked over this icon.

The BASIC Way

Enter BASIC by typing *BASIC from the command line

Type in the following BASIC program:

```
10REM > <Beep$Dir>.!Runimage
20ON ERROR:ERROREXT ERR,REPORT$+" at "+STR$ERL
30DIM block% &100
40DIM sprite_buf% 12
50DIM icon_buf% 40
60DIM block2% &100
70REM initialise the wimp and create the task
80SYS "Wimp_Initialise",200,&4B534154,"!Beep" TO ,task_handle%
90REM create the iconbar icon
100$sprite_buf% = "!beep"
110icon_buf%!0  = -1
120icon_buf%!4  =  0
130icon_buf%!8  =  0
140icon_buf%!12 = 80
150icon_buf%!16 = 82
160icon_buf%!20 = &2182
170icon_buf%!24 = sprite_buf%
180icon_buf%!28 = 1
190icon_buf%!32 = LEN("!Beep")+1
200SYS "Wimp_CreateIcon",,icon_buf% TO icon_sprite%
210REM make the window
220w% = block%
230REM visible work area
240w%!0  =   0 :REM min x = 0
250w%!4  =   0 :REM min y = 0
260w%!8  = 550 :REM max x = 550
270w%!12 = 256 :REM max y = 256
280REM scroll offset
290w%!16 =   0 :REM scroll x = 0
300w%!20 =   0 :REM scroll y = 0
310REM handle to open behind
320w%!24 =  -1 :REM on top
330REM window flags
340w%!28 =  %10000111000000000000000000010010
350REM set up the colours
360w%?32 =   7  :REM title foreground
370w%?33 =   2  :REM title background
380w%?34 =   7  :REM work area foreground
390w%?35 =   1  :REM work area background
400w%?36 =   3  :REM scroll bar outer
410w%?37 =   1  :REM scroll bar inner
420w%?38 =  12  :REM input focus title bar
430w%?39 =   0  :REM reserved - must be 0
440REM work area
450w%!40 = w%!0 :REM min x
460w%!44 = w%!4 :REM min y
470w%!48 = w%!8 :REM max x
480w%!52 = w%!12:REM max y
490REM title bar icon flags
500w%!56 = %00101110000000000000000000111001
510REM work area button type
520w%!60 =   0  :REM ignore all clicks
530REM sprite area control block pointer
540w%!64 =   1
550REM min window width - x,y 2 byte coords
560w%!68 =   0  :REM means use title width
570REM min window height -x,y 2 byte coords
580w%!70 =   0
590REM title data
600$(w%+72) = "Beep Window" + CHR$(0)
610REM number of icons
620w%!84 =   1
630REM bounding box for icon
640w%!92 =  10
650w%!96 = 150
660w%!100= 150
670w%!104= %01110000000000000100000000011101 :REM flags
680$(w%+108) = "Beep"
690SYS "Wimp_CreateWindow",,w% TO window_handle%
700REPEAT
710 SYS "Wimp_Poll",,block% TO action%
720 CASE action% OF
730  WHEN 2: SYS "Wimp_OpenWindow",,block%
740  WHEN 3: SYS "Wimp_CloseWindow",,block%
750  WHEN 6: CASE block%!8 OF
760           WHEN 4: !block% = window_handle%
770                   SYS "Wimp_GetWindowState",,block%
780                   block%!28 = -1
790                   SYS "Wimp_OpenWindow",,block%
800           WHEN 2: CASE block%!12 OF
810                    WHEN -2: SYS "Wimp_CloseDown",task_handle%,"TASK"
820                    WHEN window_handle%: VDU 7
830                   ENDCASE
840          ENDCASE
850  WHEN 17,18: IF block%!16 = 0 THEN
860                SYS "Wimp_CloseDown",task_handle%,"TASK"
870               ENDIF
880 ENDCASE
890UNTIL FALSE
900END
```

Create a directory called !Beep

Save the program as !Runimage into the directory

Create a !Sprites file containing a sprite called !Beep

The Easy Way

Run Genesis II by double clicking on its icon

Drag the new application icon from the Genesis icon bar menu, into a directory display

Drag open a frame in the window

Type the word 'Beep' into the Info->Word menu option

Double click on the 'select' icon on the new frame's 'Link to' dialogue box

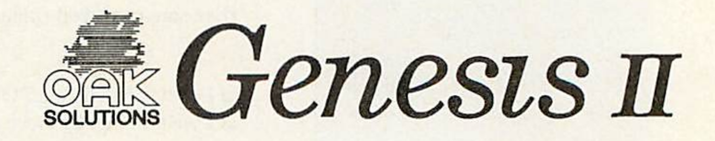
Type the word 'Beep'

Click on OK

Click on the 'Save Page' menu option

RISC OS Programming made easy

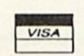
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Tel: 0705 325354



BANK MANAGER
Complete and versatile personal accounts program. Consistently acclaimed! *'data entry is a delight...professional...excellent product' Micro User April 86*
Standard version: Enter cheques and receipts. Automatic date sequencing. Reconcile statements. Search, amend and delete. Analyze expenditure. Forward cash flow forecast. Budgets. Up to 36 bank accounts online, inter account transfers, 9999 standing orders, 99 analysis headings, over 4,000 postings on an 80tk diskette. Reports to screen or printer. Mix foreign currencies, graphics, password, file recovery, field editing, programmable reports.
Master/Compact version adds ADFS/hard disk support, sideways RAM, 40/80 col screen reports, and other enhancements.
Archimedes/A3000 adds high speed native mode, RAM disks, wild card analysis enquiries, sort and more. *'Impressed...ideal...easy to use' Micro User March 88*
Bank Manager (all versions; disk systems only) £25.00

BANK MANAGER BUSINESS UTILITY
For the club accounts or small business user. From the Bank Manager data files print "trial balance" or "P&L reports" via the programmable spreadsheet generator.
Business Utility Pack (needs the Bank Manager) £12.00

TYPING TUTOR
Quickly learn to touch type. Over 90 smoothly graded lessons graduate you from the basic home keys to complete keyboard mastery. Word scan or exact key checking, targets may be revised, rhythm metronome, key click, free format options. Recommended for adult education. ***Typing Tutor £15.00***

SPREADSHEET MK V
Low cost, versatile spreadsheet. 26 cols, 900 (Arch/A3000) or 99 (B/Master) rows, many functions and facilities inc programmable report writer and input scripts.
Spreadsheet MK V disk £15.00

All programs available in B, Master/Compact and Archimedes/A3000 versions. Archimedes/A3000 versions are RISC OS compatible

State type of computer (eg A3000,B,Master) and disk type (eg 3½" or 5¼" 40 track or 5¼" 80 track). Please add £1 P&P (Overseas £3.50)

CONTEX COMPUTING
(Ref AU), 15 Woodlands Close,
Cople, Bedford MK44 3UE




Tel: 0234 838347

ArcModem
A brand new 2400 baud pocket sized modem for the Archimedes/A3000
- Fully Hayes compatible
- BELL 103/212A
- CCITT V.21/V.22/V.22bis
- Protective cover
- Elegant design in compact size
- Mains or battery powered
- Intelligent power/saving circuit
- Long battery life

Comes complete with drivers for ArcTerm* versions 6 and 7
ArcModem, Mains adapter 9v battery, leads and driver software:

Only £169.00

Arcterm 7 is a fully multitasking comms package. Available from The Serial Port

The RTFM Joystick Interface
The interface allows up to two 9pin Commodore® or Atari® style joysticks to be connected to your Archimedes/A3000. The interface fits inside your machine, though it does not require a podule slot.
The RTFM Joystick Interface has support from 4th Dimension, Eterna, Krisalis Software, Cygnus Software Engineering, Clares Micro Supplies, Cambridge International Software and Minerva Software.
Over 40 Archimedes games currently work with the Joystick Interface, and you can even control games running under the BBC Emulator!

Only £34.95

Archimedes / A3000 Games
Pon! (**£17.95**, seriously cute, and 9/10 from Micro User)
Brixx! (**£17.95**, the most irritating tune in history, and Micro User gave it 9/10)
Slappit (**£17.95**, ever tried playing football, snooker and pinball at the same time?)
The Arc/A3000 Winter box (**£19.95**, pack includes: Pon in Winterland, Brixx and Zap the Red Wierdos from Mars)
Dominate (**£19.95**, can you find the solution?)
Rekall (**£14.95**, test your powers of memory and deduction)
Bouncer (**£19.95**, fast action arcade game with full screen continuous animation)



RTFM, 43 Hill Street, St Helier, Jersey.
✆ (0534) 67870, Fax (0534) 68996.



Watford Electronics

(A member of the Jessa group of Companies – Established 1972)



Jessa House, 250 Lower High Street, Watford WD1 2AN, England
Tel: Watford (0923) 37774 Tlx: 8956095 Fax: (0923) 33642



The sign of Quality

Shop Hours: 9am to 6pm (Mon.-Sat.) Thursday 9am to 8pm. FREE customer car park.
All prices exclusive of VAT; subject to change without notice & available on request.

The choice of Experience

Archimedes micro

System	Basic	Mono	Colour	Multiscan
410/1	£1099	£1159	£1278	£1448
420/1	£1299	£1359	£1478	£1648
440/1	£1699	£1759	£1878	£2048
540/1	£2995	£3065	£3178	

Archimedes A3000

12 MONTHS FREE MAINTENANCE ON SITE

- A3000 Microcomputer **£599**
- A3000 + Learning Curve pack **£699**

- 3.5" External Drive £99
- Monitor Stand £16
- External Podule Case £13
- User/Analogue Port Upgrade £42
- Serial Upgrade £17
- Technical Manual £60
- SCSI Card £149
- Dust Cover Micro only £5
- Dust Cover for Micro + Monitor £9
- User port/MIDI upgrade £45
- UHF TV Modulator £30

Unbeatable Sale Offers on Archimedes Micro

When you purchase an Archimedes Micro from Watford, look what you get FREE with it

Micro	Free Offer
A410/1	Upgraded to 2MB RAM & 44MB IDE Hard Drive
A420/1	Upgraded to 4MB RAM & 100MB IDE Hard Drive, MkII Learning Curve pack incl. Acorn DTP pack
A440/1	High Res 14" Multiscan Colour Monitor
540/1	High Res Multiscan Monitor & Panasonic KX-P1180 Printer
A3000	Upgraded to 2 Megabyte of RAM & a A3000 Monitor plinth.

+ 12 months FREE On-Site Maintenance
(P.S. Instead of the above Hardware upgrades on A410/1 & A420/1, we will fit the 30MHz Turbo Board if required. Please specify your requirement when ordering.)

Archi Accessories

- NEW Multitasking RISC OS £29
- 3.5" 800K 2nd Floppy Drive (305/310) £118
- 5.25" 800K external Floppy Drive £85
- I/O Podule (with Analogue port, User port, & 1MHz bus) £76
- MIDI add-on to I/O Podule £27
- MIDI Expansion Card £65
- Sound Sampler Mono (Armadillo) £129
- Sound Sampler Stereo /Midi (Armadillo) £186
- Chromalock Podule (Wild Vision) £275
- Econet Network Board £44
- Archimedes IEEE Interface Adaptor £269
- Dual RS232 Podule £195
- 16 bit parallel I/O Card £195
- Archi replacement mouse – New design £32
- PC Emulator NEW Faster Version £62
- Software Developers Toolbox £149
- Floating Point Unit £455
- SCSI Adaptor Expansion Card £162
- Keyboard Extension Lead £6
- 2 Podule Backplane £25
- 4 Podule Backplane £38
- Fan for above backplanes £8
- Risc Os Extras Software Disc £5
- Smoked Perspex Low profile Keyboard Cover £8
- Ethernet Card £220

8 Meg RAM Upgrades

- **R810** – A410/1 upgraded to 8MB £599
- **R820** – A420/1 upgraded to 8MB £569
- **R840** – A440/1 upgraded to 8MB £499
- **R814** – R140 upgraded to 8MB £499

Turbo Charge Your Archimedes

Increase the speed of your Archimedes by a factor of THREE to SIX times (depending on the software you are running), with Watford's ARM3 Upgrades.

- **ARM-3** Upgrade Board £299
- **MEMC** 1A Upgrade £42

(ARM 3 price includes a FREE Chip extraction tool)
(Special Offer – If purchased together with an Archimedes Micro, then not only will we fit the card Free of Charge but we will also reduce the price by £25 i.e. You pay only £274 for ARM3 Board

Archimedes RAM Upgrade

All our memory upgrades are simple to fit. No soldering required. Fitting instructions supplied.

- **R302**-A3000 – to 2MB RAM Upgrade £35
- **R303**-A3000 – to 2MB RAM Upgrade (expandable to 4MB) £69
- **R304**-A3000 – to 4MB RAM Upgrade £159
- **R311**-A305 – to 1MB RAM Upgrade £50
- **R312**-A305/310 – to 2MB RAM Upgrade £215
- **R314**-A305/310 – to 4MB RAM Upgrade £405
- **R412**-A410/1 – to 2MB RAM Upgrade £35
- **R413**-A420/1 – to 4MB RAM Upgrade £64
- **R414**-A410/1 – to 4MB RAM Upgrade £98

Archimedes Hard Disc

Watford's ST506 Hard disc drives for A310 & A410 series fit internally into the space provided. The 'simple to follow' fitting instructions supplied makes drive fitting very easy. All disc drives are auto parking. 40Meg & 53Meg drives are fast 24mS type, while 20MHz are 28mS.
P.S. A310 upgrades require a backplane and a fan.

- **3HDP** – Hard Disc Podule only £135
- **3HD20** – 20Meg H' Disc + Podule for 310 £235
- **3HD40** – 40Meg H' Disc + Podule for 310 £345
- **3HD50** – 53Meg H' Disc + Podule for 310 £474
- **4HD20** – 20Meg Hard Disc for 410 £129
- **4HD40** – 40Meg Hard Disc for 410 £215
- **4HD50** – 53Meg Hard Disc for 410 £335
- A3000 20Meg Hard Disc + Podule £299
- A3000 40Meg Hard Disc + Podule £429

IDE HARD Disks: See page 14 of our advert.

Convert your Archi 410 to a 420 or 440 with Watford's unique Upgrade Kits

UP10	to 2MB RAM + 20MB Hard Disc	£165
UP15	to 2MB RAM + 40MB Hard Disc	£252
UP20	to 4MB RAM + 20MB Hard Disc	£232
UP30	to 4MB RAM + 40MB Hard Disc	£318
UP40	to 4MB RAM + 53MB Hard Disc	£438

Silicon Vision

Gerber Plot	£95	Super Dump	£22
Solid CAD	£120	Solids Render	£120
Super Plot	£28	Solid Tools	£279
Arc PCB Professional			£275
Realtime Solids Modeller			£136

Archi Mouse Port Splitter

Our handy little splitter unit eliminates the risk of damaging your micro due to constant plugging and unplugging of the mouse by allowing you to connect both, a joystick and a mouse simultaneously to your Archimedes. £15

Stop Press

After months of secret development, Watford Electronics are proud to launch their highly desired ARM 3 Upgrade for the A3000 microcomputer at the BBC Acorn User Show, Wembley Conference Centre, in October 1991.
You are invited to preview this exceptional board on our stand. Our technical staff will be in attendance.

Graphics, Art, Design & Games

GRAPHICS	
Atelier	£65
Artisan II	£45
Artisan Gallery	£16
Autosketch II	£65
Craftshop 1 & 2	£28
Euclid 2	£50
Graph Box	£59
HotLink Presenter	£40
Kermit	£46
Mogul	£17
Poster	£79
Pro Artisan	£70
Render Bender	£58
Snippet	£21
Tween	£21
GAMES	
ArcPinball	£18
Apocalypse	£15
Arcade 3 Compil.	£12
Arcade Soccer	£15
Arc Pinball	£18
Arc Trivia	£18
Avon	£16
Ballerina	£14
Blowpipe	£16
Boogie Buggy	£19
Break 147	£20
Bug Hunter	£14
Caverns	£14
Chess 3D	£14
Chocks Away	£14
Conqueror	£18
Cops	£14
Corruption	£18
Crisis	£21
Drop Ship	£12
Enthar Seven	£21
E-Type	£13
E-Type Designer	£13
E-Type Extra 100 miles	£13
Family Favourites	£15
Fireball 2	£19
Holed Out Designer	£13
Holed Out Golf	£13
Hostages	£15
Ibix the Viking	£14
Inertia	£13
Inter Dictor 2	£26
Iron Lord	£15
Jet Fighter	£10
Jiglet	£25
Jigsaw	£27
Magpie	£39
Man at Arms	£16
MahJong Patience	£15
Manchester United	£19
Nevryon	£14
Olympics	£15
Pipe Mania	£17
Pirate	£16
Power Band	£18
Puncman 1 & 2	£16
Puncman 3 & 4	£16
Pysanki	£15
Real McCoy	£22
Real McCoy 2	£23
Redshift	£14
Return to Doom	£16
Revelation	£54
Repton 3	£15
Rotor	£19
Splice	£25
Sporting Triangles	£24
Star Trader	£14
Superior Golf	£15
Talisman	£12
The Pawn	£19
Thundermonk	£11
Timewatch	£24
Trivial Pursuit	£22
Twin World	£15
U.I.M.	£23
White Magic	£15
White Magic 2	£15
Wimp Game	£15
Worldscape	£16
Miscellaneous	
Ancestry	£59
Arccomm 2	£38
Arcterm 7	£64
Armadeus Sound	£60
BBC DFS Reader	£6
Broadcaster Loader	£65
Equasor	£40
FlexiFile	£98
Genesis	£65
Genesis 2	£113
Hearsay Comms Pack	£50
Investigator 2	£22
JX Archi Colour Printer Driver for Citizen & Star	£15
Numerator	£66
Presenter 2	£35
Presenter Story	£145
Revelation	£58
Rhapsody in Blue 2	£45
Speech!	£15
Toolkit (Clares)	£35
Touchtype	£40
Tracer	£46

LANGUAGES (Archimedes)

ISO-PASCAL; FORTRAN 77			£77 each
Assembler; LISP; Prolog X			£149 each
ANSI C Rel. 3	£125	BASIC Compiler	£77
Cambridge Pascal	£60	Logotron Logo	£45
Macro Assembler	£40	Risc Basic	£120
Robo Logo	£69	Risc FORTH	£110

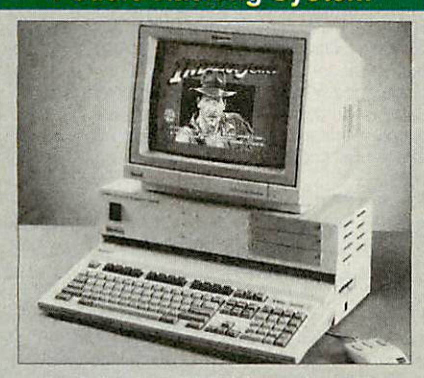
Minerva's Archimedes Software

Home Accounts*	£36	Sales Ledger*	£53
Stock Manager*	£53	Purchase Ledger*	£53
Nominal Ledger*	£53		
Ancestry	£59	Reporter	£29
System Delta+	£55	Mailshot*	£29
System Delta + Reference Manual			£25
Order Processing/Invoicing*			£53
School Administrator			£118

* *Requires System Delta*

NEW Business Accounts Packages
Nominal Ledger, Order Processing/Invoicing, Purchase Ledger, Sales Ledger & Stock Control
Price: £78 per Module or
£299 for the complete Software Suite

ULTIMUM – Archimedes A3000 Podule Racking System



THE ONLY LOGICAL WAY TO EXPAND YOUR A3000 COMPUTER

The accepted standard for Archimedes computer expansion is the Acorn Podule, designed initially to fit the old 310, and also for the later A400 and A400/1 series micros. The podules fit inside these computers up to four at a time. The A3000 is the little brother of the family, but can only have one podule at a time, plugging into the back of the computer.

Other attempts have been made to expand the A3000 by trying to introduce a 'mini-podule'. This is impractical for many reasons, amongst which is the reluctance of manufacturers to produce them. Nobody wants to re-design podules already produced. Some cannot be produced on a 'mini-podule' as they are far too complicated and simply wouldn't fit.

Watford Electronics listens to the demands and requirements of its customers, and we are glad to say that we have come up with the only real solution to the A3000 expansion problem. The ULTIMUM Podule Racking System allows up to three FULL SIZE standard Archimedes 300/400 series podules to be fitted to the computer. In addition, there is also provision for a hard disc drive and a podule to be fitted internally.

Since the ULTIMUM Podule Racking System takes proper full size podules, you will be able to use any of the currently available peripheral equipment, from companies like Computer Concepts, Armadillo, Acorn and of course, our own brand.

Fitting the podules to 'ULTIMUM' is simple. They are neatly fitted inside the metal case of the rack, avoiding the previously untidy method of hanging the podule off the back of the computer, risking damage to both, it and to the computer.

'ULTIMUM' has its own power supply, so no strain is put on the A3000 power supply. There is also an IEC mains output socket for an Acorn type monitor so reducing the number of plugs required to go to the mains. The ULTIMUM is rigidly clamped over the top and under the computer, and allows direct access to the floppy disc drive and reset button, rather than obstructing access as on other systems. The mounting method employed is so firm that the computer could even be safely transported without the assembly falling apart.

Price: £125

Archimedes A300/A400 SCSI Hard Disc Offer
(while stocks last)

100MB Hard Disc Upgrade complete with Controller card, Cables, Formatter and Manuals

RRP: £999
Offer Price: £399

Archimedes to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.
New RISC OS Version **Only £15**

Archimedes External Disc Drive Interface

With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Upto 4 disc drives can be connected. Fully Buffered Board. NO SOLDERING is involved. Supplied complete with necessary lead.
- A300/A3000 £21
- A400 £25

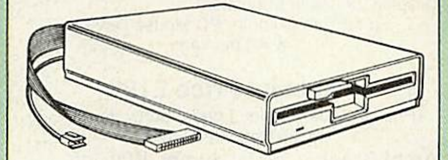
Special Education Prices

All education establishments qualify for special education prices on micros, etc. Please write in or telephone (0923) 37774 or 50335 for written quotation.

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below) **£399**

FREE OFFER



A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control.

FREE with every BBC Master purchased from us during August

ADD-ONs & ACCESSORIES

Turbo 65C102 Add-on Module		£115
Econet Module for the Master		£45
Twin ROM Cartridge for Master		£9
Quad ROM Cartridge for Master		£14
Master Reference Manual I	(No VAT)	£14
Master Reference Manual II	(No VAT)	£14
Master Advance Ref Manual	(No VAT)	£17
64K Upgrade Kit for B+		£32
Acorn 1772 DFS Kit complete		£49
ECONET Upgrade Kit for BBC B		£42
ALL ECONET UPGRADES Available		
ARIES' IEEE Interface for BBC B & Master		£238
Morley Teletext Adaptor with ATS Rom		£99
Ecolink		£270

NEW LAUNCH for Archimedes

See Page 14 of our advert

Desk Top Publisher

Acorn's Archi DTP Package	**£108**
Impression 2 DTP Pack	**£135**
Impression Junior	**£76**
Tempest DTP Package	**£95**

Archi Wordprocessors

Pendown Archi	£48	Archie Spell Master	£25
Wordwise + Disc	£24	PD Spellchecker	£40
Image Writer	£25	View	£45
Interword Disc	£24	Graphic Writer	£19
1st Word Plus – 2	£63	EasyWord	£30

Databases

AlphaBase	£36	Multistore	£195
Knowledge Organiser	£42		

Spreadsheets

Intersheet Disc	£24	Viewsheet	£45
Sigmasheet	£39	Schema	£89

Business Graphics

GammaPlot	£39	Sigmaplot	£39
Interchart Disc	£17		

Integrated Packages

- Logistix £79
- Pipedream 3 £119
- Desktop Office – Database, Graphs & Charts, Wordprocessor Spreadsheet, Communications £98
- Desktop Folio – Wordprocessor, Desktop & Interactive Publishing. Ideal for school environment. £85

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

A3000 BBC User, I/O Card, Analogue Port IIC Card

This NEW versatile I/O Card from Watford, fits inside the A3000 and includes an Analogue to Digital Converter, a User Port, and an InterIC (IIC) connector.

The card allows many of the peripherals developed for the BBC to be used with the Archimedes A3000. The ADC and User Port have the same pin out and connectors as the BBC computers.

Extensive RISC OS software is supplied to provide BBC OSBYTE calls for support of the ADC and User Ports, including the BASIC keyword ADVAL. The software provides extended RISC OS support for separate interrupts from both the ADC and User Ports, permitting easy interrupt driven operation.

The card is provided with all the software in ROM and is automatically loaded when the machine is turned on.

Peripherals connected to the ports can obtain up to 500mA of power at +5V. A fuse is fitted to the card to protect the A3000 from damage arising from accidental short circuit of the power output.

The card is provided with an extensive manual explaining installation, all software commands, connector pin outs, hardware addresses and example programs.

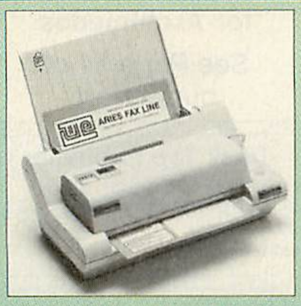
Features
- An 8 bit User Port with a standard 20 way IDC connector, compatible with the User Port on the BBC computers and the Archimedes I/O Podule.
- A 10 bit Analog to Digital Converter with a standard 15 way D type connector, compatible with the ADC on the BBC range of computers and the Archimedes I/O podule.
- An InterIC (IIC) Port with a 5 pin DIN socket to connect the A3000 to external IIC devices.

£42

Call or write in for our NEW 100 page Summer Catalogue

Continued→ → → → → → → → →

Archi A4 Scanner



This new A4 image scanner from Watford Electronics is supplied complete with ROM based podule software. Features provided include facilities for zooming in on an image and inverting the image in X and Y directions, saving and printing of the sprite created. Interactive help is supplied using the !HELP application on the Acorn applications discs.

The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures.

Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control achieve optimum image clarity.

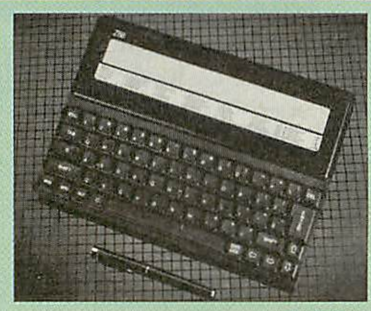
Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image.

All these features and facilities combine to make the Archi Page Scanner the fast and convenient way in which to add that extra impact, interest and clarity to documents, reports, instruction sheets, manuals, news letters, etc., from your Archimedes DTP package.

Introductory Prices:

Archi A4 Scanner	£349
Sheet Feeder for above	£95
Scanner + Sheet Feeder	£419

Z88 Portable Micro



£185

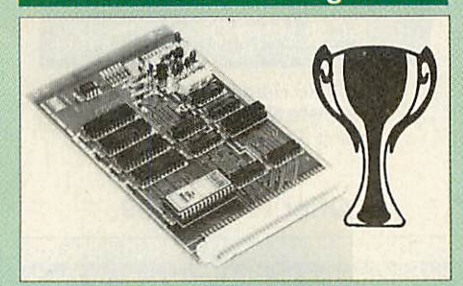
FREE

With every Z88 purchased from us, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

Z88 ACCESSORIES

- 32K RAM Pack or 32K EPROM Pack £18.00
- 128K RAM Pack or 128K EPROM Pack £42
- 512K RAM Pack £175
- Z88 Eprom Eraser Unit £33
- Z88 Spellmaster for Pipedream £45
- Z88 Carrying Case £8
- Z88 Computing Book £9.95
- AA Nicad Rechargeable Battery £1.50
- Battery Charger Compact & Fast £6
- Z88 Serial Printer Cable £8
- Z88 Parallel Printer Cable £25
- Z88 to Archi Link £15
- Z88 to BBC Link £20
- Z BASE £56
- Z88 to PC Link II £30
- Z TAPE £42
- Z88 to Macintosh £52
- Z TERM £42
- Z88 Mains Adaptor £9
- Z88 Modem £149

Archi Real-Time Digitiser



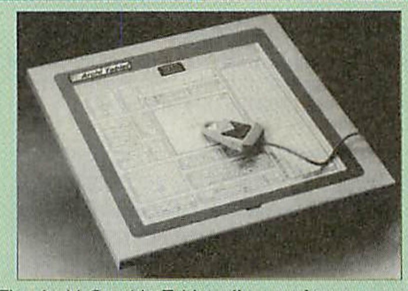
Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £175

A Set of Colour Filters for colour image grabbing using a video camera	£16
New Risc-OS Software Upgrade	£39

Archi Graphic Tablet



The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear Graphic for use in Education).

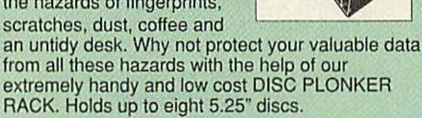
(FREE this month, PC Mouse Drivers & Art package)

Special Price £199

(Price includes Tablet, Leads, Software & Puck) Stylus Optional Extra **£15**

Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus **£125**

Disc Plonker Rack



When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: £2

Acorn & Watford DFSs

- Watford sophisticated DFS ROM £16.00
- Watford DFS Kit complete £69.00
- We will exchange your existing ROM for Watford's ultimate DFS ROM at only £12.00
- DFS Manual (comprehensive) £6.95
- Acorn DNFS ROM £17.00
- Acorn ADFS ROM only £25.00
- Acorn 1770 DFS ROM Kit £49.00

(The single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with the their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

Watford's MkII 1772

Single/Double Density DFS

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features.

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£39.00.**

- SPECIAL PRICE **£44.00**
- DDFS Manual (No VAT) **£6.95**
- We will exchange your existing DFS Kit for our sophisticated DDFS for only **£30.00**

Please note, as the MkII DDFS is a hardware and sofware upgrade, it is not possible for existing Watford DDFS users to simply exchange the ROM for the new version.

3M – Diskettes

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electonics your 3M Appointed Distributor

- *10 x 5.25" S/S D/D 40T (744)* **£5**
- *10 x 5.25" D/S D/D 40T (745)* **£5**
- *10 x 5.25" S/S D/D 80 Track (746)* **£7**
- *10 x 5.25" D/S D/D 80 Track (747)* **£7**
- *10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT* **£9**
- *10 x 3.5" S/S D/D 40/80 Track* **£7**
- *10 x 3.5" D/S D/D 40/80 Track* **£7**
- *10 x 3.5" Double Sided High Density* **£13**

Top Quality 3.5" & 5.25" Diskettes

To complement our range of Quality Discs and Disc Drives. WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

- *10 x **M3** 3.5" D/S D/D 80 Track* **£7**
- *10 x **M9** 3.5" D/S High Density* **£12**
- *10 x **M4** 5.25" S/S D/D 40 Track* **£5**
- *10 x **M5** 5.25" D/S D/D 40 Track* **£5**
- *10 x **M7** 5.25" D/S D/D 80 Track* **£7**
- *10 x **M8** 5.25" D/S H/D Hi-Density* **£9**
- ***M2** 3" Double Sided* **£2.50 each**



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Quality Disc Drives from Watford

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. All 5.25" Disc Drives are 40/80 track switchable. For ease of use, the switches are front mounted. Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

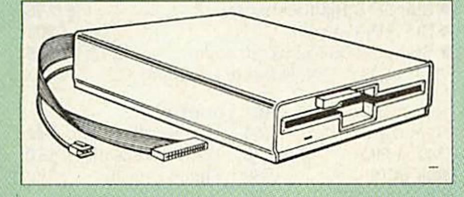
If you look around the popular BBC Micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

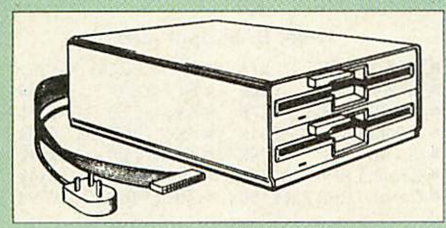
Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. ***Ideal for Schools & Colleges.***

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space. Your BBC Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double Plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with a Watford plinth. *(Turn to the 6th page of our advert for the Plinths).*

P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is our special Compact Disc Drive cables designed by us.

"Test Bureau Approved for Use in Education"



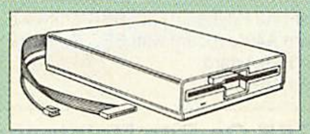


Our Disc Drives conform to BS415

Type	Description	
	Disc Drive without PSU	
• **CLS400S:**	Single, 40/80 track 400K Double sided Drive	**£72**
• **CLD800S:**	Twin, 40/80 track, 800K Double sided Drives	**£142**
	Disc Drive with PSU	
• **CS400S:**	Single, 40/80 track, 400K Double sided Drive	**£82**
• **CD800S:**	Twin, 40/80 track, 800K Double sided Drives	**£155**

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Disc Drive/DDFS Offer



- The popular CLS400S 40/80 track switchable disc drive.
- Watford's popular Mk II DDFS Interface (allows up to 720K storage). Will run both in single & double density modes.
- A comprehensive DFS Operating manual

Bargain at Only **£116** (Offer valid until stocks last)

3.5" DISC DRIVE

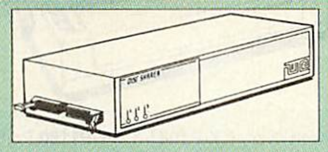


These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Type	Description	
	Disc Drive without PSU	
• **CLS35:**	Single Disc Drive, 400K	**£62**
• **CLD400S:**	Twin Disc Drives, 800K	**£109**
	Disc Drive with PSU	
• **CS35:**	Single Disc Drive, 400K	**£83**
• **CD35:**	Twin Disc Drives, 800K	**£126**

(P.S. CS35 is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage)

Disc Drive Sharer

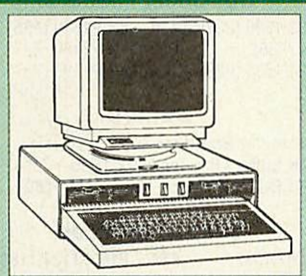


(Ideal for educational establishments)

A low cost alternative to the Econet system.Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Price includes 3 Cables **£55**

Disc Drives in Monitor Stand



• **CDPM 800S** – Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

£165

• **DP35 800** – Same as above except, one disc drive is a 5.25" and the other is 3.5".

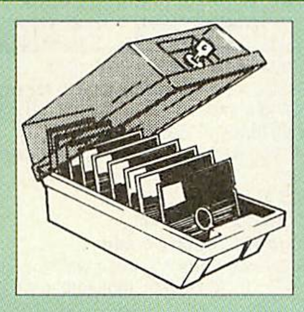
£154

Floppy Head Cleaner Kit

The heads in floppy drives are precision made and very sensitive to dirt. The use of Cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

Antistatic Lockable Disc Storage Units

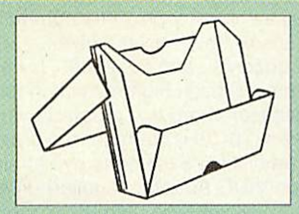


Gives double protection – Strong plastic case that affords real protection to your discs.
Antistatic helps avoid data corruption whilst in storage. The smoked top locks down.
Dividers and adhesive title strips are supplied for efficient filing of discs.

- **M35** – holds up to 50 5.25" discs **£4.95**
- **M85** – holds up to 95 5.25" discs **£6.95**
- **M25*** – holds up to 25 3.5" discs **£4.95**
- **M50** – holds 50 3.5" discs **£6.50**
- **M10** – holds 8 of No. 10 Data Cartridges **£15**

* Not lockable

Plastic Library Cases



Holds up to 10 x 3.5" Discs. **£1.50**
Holds up to 10 x 5.25" Discs. **£2.00**

Dust Covers (For our Disc Drives)

Single CLS (without PSU)	**£3.20**
Single CS (with PSU)	**£3.25**
Twin CLD (without PSU)	**£3.85**
Twin CD (with PSU)	**£3.90**

Disc Albums

Attractively finished in black leather-look vinyl. Stores up to 20 discs. Each disc can be seen through the clear view pocket.

£4

Special Bulk Offer on Discs

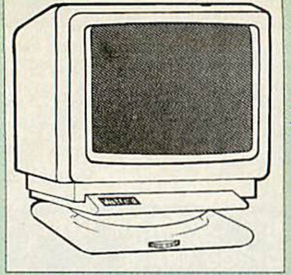
(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)



BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
• Without Sleeves 5.25"	£30	£35	£40
• With Sleeves 5.25"	£33	£38	£43
• 3.5" D/S D/D	£29 for 50	£52 for 100	

Continued→ → → → → → → → →





Microvitec Monitors

- **1431** – Standard Resolution Monitor £169
- **1451** – Medium resolution, suitable for word processing in mode 0 £209
- **Cub3000** Medium Res for A3000 £189
- **1441** – High res, exceeds the capabilities of the BBC Micro £359
- **2040 CS** 20" Hi Res £675
- Dust Cover for Microvitecs £5.50
- **Touchtec 501 Touch Screen** £239

Now 3 years Parts & Labour warranty on all Microvitec Monitors

Multiscan Colour

• Eizo 9060S	£389	• NEC 5D	£1299
• Eizo 9070S	£579	• Taxan 770LR	£379
• NEC 2A	£255	• Taxan 775	£375
• NEC 3D	£345	• Taxan 795-PC	£425
• NEC 4D	£679	• Taxan 875	£725
• VIDC Enhancer Board			£25

(P.S. Taxan 795 monitor is supplied with a FREE VIDC enhancer board)

Aries AlphaScan Monitor

Pound for Pound, the AlphaScan VGA Multiscan monitor provides the maximum performance and greatest flexlbility of any 14" colour monitor.

Its multiscan circuitry provides automatic adjustment for frequencies between 30 and 60KHz horizontal, and 50 and 90Hz vertical. Its 0.28mm dot pitch high resolution tube provides super sharp text graphics, while a high speed (70/72Hz) refresh rate provides a flicker-free display easing the eye strain. The Multivideo VIDC Adaptor supplied (free) with the monitor allows high resolution operation in all screen modes.

£325

Philips Monitors

- **BM7502** 12" Hi-res Green Monitor £70
- **BM7522** 12" Hi-res Amber Monitor £67
- **CM8833** 14" Med. Res Colour Monitor £178
- TV Tuner for CM8833 Monitors £62

Dust Cover for Philips Monitors £6

(Securicor carriage on Monitors £7)

Spare Monitor Leads

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

£12

Canon Bubblejet Printers

	Printer	CSF	D'ble Bin	Ink Cart
BJ10E	£205	£54		£18
BJ300	£354	£88	£65	£12
BJ330	£399	£110	£79	£12

- Spare Battery pack for BJ10E £33

NEC Pinwriter Printers

• P20	£186	• P70	£475
• P30	£250	• P90	£655
• P60	£374		

Concept Keyboards

Standard A3 Keyboard with BBC Software	£143
Standard A4 Keyboard with BBC Software	£117
Archi A3 Keyboard	£144
Archi A4 Keyboard	£118

FREE On-Site Maintenance

This month we are also offering at no extra cost to all our customers, 12 months, On-Site Maintenance on all Multiscan colour monitors, all Panasonic printers, and all Laser Printers, Roland Plotters and of course the full range of Archimedes micros. Should the machine fail, simply telephone the maintenance engineer, who will call in within 12 working hours.
(Offer applicable only when bought at prices advertised in this advert. UK mainland only).

Hewlett-Packard Printers

• # Desk Jet 500	£299	• Paintjet XL	£1092
• Desk Writer (Mac)	£482	• Quiet Jet Plus	£359
• Desk Jet Cartridge	£15	• HP Think Jet	£239
• Paint Jet Colour	£589	• Rugged Writer	£839

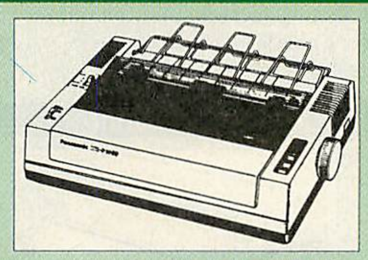
Now 3 years extended Parts & Labour warranty

- Paintjet Cartridges Black **£19;** Colour **£25**
- Desk Jet 500 256K RAM cartridge £129
- HP Epson FX Emulation Cartridge for Desk Jet £59

HP Apple Talk Interfaces for

- Scan Jet £299 • Paint Jet £POA
- Desk Jet Unlimited (Book No VAT) £19.75

Panasonic Printers



FREE with every **KX-P1081 & KX-P1180** Printers: A printer lead (please specify type required) and a Dump Out 3 ROM for the BBC Micro or 1,000 sheets of paper for other micros (please specify)

- **KX-P1081** 9pin 80col. 144/28 cps £116
- **KX-P1180** 9pin 80col. 192/38 cps £119
- **KX-P1123** 24pin 80col. 192/63 CPS £158
- **KX-P1124i** 24pin 80col. 192/63 CPS £215
- **KX-P1624** 24pin 132col. 192/63 CPS £299
- **KX-P1695** 9pin 132col. 330/86 CPS £299
- **KX-P1654** 24pin 132col. £429

Above prices include FREE, Watford's 12 months on-site maintenance

Panasonic Accessories

Cut Sheet Feeders

KX-P1592/1595 (P32)	£175	KX-P1540 (P35)	£175
KX-1124 (P36)	£79	KX-P1180 (P37)	£70
KX-P1624/1695 (P38)	£124	KX-P1123 (P37)	£70

Buffers

P12	4K buffer Board for 1081	£55
P42	32K buffer Chip for 1592/1595	£16
P43	32K Buffer Chip for 1540/1124/1180	£16

Serial Interfaces

P17 P1081/1592 £32 **P19** P1124/1180 £49

Citizen Printers

120D Plus	£96	124D Printer	£138
Prodot 9	£205	Prodot 24	£225
Prodot 9X	£245	Swift 24#	£205
Swift 9	£138	Swift 24X	£279

- Prodot Cut Sheet Feeder £120
- Swift 24 Colour Option £29
- Swift 24 Ribbons Black **£4** Colour **£13**

Special Offer this month – A FREE Colour option cartridge with every Swift 24 printer purchased from us.

Star Printers

- **LC10** 9pin 80col. 144/36 CPS £112
- **LC15** 9pin 136col. 180/45 CPS £180
- **LC24-10** 24pin 80col. 180/60 CPS £150
- **LC24-15** 24pin 136col. 200/67 CPS £295
- ***FR10** 9pin 300/76 CPS 31K 16 fonts £229
- **FR15** Wide carriage version of above £290
- ***XB24-10** 24pin 80col. 240/80 CPS £299
- **XB24-15** 24pin 80col. 240/80 CPS £365
- **XB-24** Colour Kit £29
- **LC-200** Colour 9pin 80col. 180/45 CPS £158
- **LC-24-200** 24pin 80col. 222/67 CPS £189
- **LC24-200** Colour 24pin 80col. 222/67 CPS £222

*FREE Colour Ribbon with these printers

Star Accessories

Cut Sheet Feeder

LC10/200/24-10	£65	LC15/LC24-15	£125
XB24-10	£80	XB24-15	£139

Serial Interfaces

SPC-10 LC10; LC10-II; LC10-Col; LC15; LC24-10; LC24-15; LC-200; LC24-200 £49
8K Ser LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15 £64

Paper Roll Holders

LC-200; LC24-200; LC24-200 colour £29

Buffers

32K Ram Card for LC/XB24-10; 15; LC200 £55

Ribbons

LC10; LC10-II; LC15	Black **£4;**	Colour **£6**
LC-200; LC24-200	Black **£5;**	Colour **£12**
XB24-10; XB24-15	Black **£5;**	Colour **£12**

Laser Printers

• Canon LBP-4	4ppm	£655
• Canon LBP-8 IIIR	8ppm	£1505
• Canon LBP-8 IIIT	8ppm	£1389
• Epson EPL7100	6ppm	£689
• HP Laserjet III	8ppm	£1025
• HP Laserjet IIID	8ppm	£1819
• HP Laserjet IIIP	8ppm	£729
• HP Laserjet IIIsi	16ppm	£2599
• Panasonic KX-P4420	8ppm*	£648
• Panasonic KX-P4450i*	11ppm*	£1025
• Panasonic KX-4455 Postscript	11ppm*	£1699
• Qume Crystal Print Publisher 2		£1899
• Star LP-8 III		£979
• Star LP-8 Star(post)script		£1195
• Star LP-4 4ppm		£705
• Star LP-4PS Postscript 4ppm		£875

* Now 2 years warranty

Laser Toners

Canon 2 & 4	£54	Laserjet IIP & IIIP	£55
Epson GQ	£18	Laserjet II/D, III/D	£70
Star LP-8	£69	Qume Crystal	£56
KX-P4420/50	£22		

Laser RAM Upgrades

• IIP & III 1MB	£74	• EPL7000 2M	£365
• IIP & III 2MB	£109	• GQ5000 512K	£95
• II & IID 1MB	£76	• KX4420/50 1M	£115
• II & IID 2MB	£112	• KX4420/50 2M	£159
• II & IID 4MB	£299	• KX4420/50 4M	£349
• Canon LBP4 1M	£175	• Star LP8 1M	£143
• Canon LBP8 2M	£150	• Star LP8 2M	£285

Laser Drum & Developer

• Epson Drum	GQ5000	£93	EPL7100	£129
• Panasonic 4420 Drum		£60	Developer	£59
• Panasonic 4450 Drum		£93	Developer	£80
• Qume Drum		£76	Developer	£56

Jetpage Postscript Cartridge

- HP IIP/III £255 IID & IIID £265

NEW – HP Laserjet

Various Font Cartridges	£45
Superset Font	£195

Integrex Colour Jet

- Colour Jet 132 Printer £515
- Paper Roll £6.50
- BBC Screen Dump Software £10
- Colour Cartridge £19.50
- Black Cartridge £11.25
- 100 A4 OHP transparencies £55
- 8K Serial Interface Optional £123

INCREDIBLE INKJET PRINTERS OFFER

Laser print quality at dot-matrix prices

HP Deskjet 500 Printer	£299
Canon BJ10E Printer	£199

(Offer Valid while the present stocks last)

Epson Printers

DFX5000	£1089	LQ860 Colour	£465
DFX8000	£1999	LQ1050+	£475
EX1000	£456	LQ1060	£599
FX850	£283	LQ2550+	£709
FX1050	£358	LX400	£109
FX1060	£599	LX850	£150
LQ400	£166	SQ850	£439
LQ550	£209	SQ2550	£645
LQ850+	£385		

Cut Sheet Feeders for

LX400/800/850/LQ400/500/550	£69
EX800/FX800/850/LQ800/850	£130
FX/LQ 1000/1050/SQ850	£159
LQ 2550 £390 SQ2550	£390

Tractor Feed for

LQ800 **£44**; LQ850/FX850 **£69**; LQ1050/FX1050 **£85**; LQ2500 **£90**; LQ2550 **£90.**

Accessories

- EX800/1000 Colour Option £45
- EX800/1000 Colour Ribbon £14
- LQ2500 Colour Option £65
- Multifont Card for LQ550/850/1050 £95

Epson Printer Interfaces

All these interfaces fit inside the printer

RS232	£32	RS232 + 2K Buffer	£52
IEEE 488	£95	RS232 + 8K Buffer	£75

Printer Leads

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Archimedes Printer Lead 6'	£6
Nimbus Centronics Lead	£6
IBM/Archimedes Parallel Lead 6'	£6
IBM/Archimedes Parallel Lead 5 metres	£13
IBM/Archimedes Parallel Lead 10 metres	£19
Double Ended 36 way Centronics Lead 4'	£7
Double Ended 36 way Centronics Lead 6'	£9
MSX Centronics Parallel Lead 4'	£12
RS232 Leads (Various)	P.O.A.
IBM Keyboard extension lead coiled	£5

Plotters

• HP7440	£425	• HP7475	£599

Roland Plotters

• DXY1100	£515	• DXY1200	£645
• DXY1300	£845	• DXY2500	£2375
• DPX3500	£3289	• Sketchmate	£333
• Roland plotter Pens, Fibre tip			£7.50

Watford VIDC Enhancer

This unique VIDC add-on board for the Archimedes, caters for all types of Multiscan and VGA monitor and mode requirements. There are 2 versions to suit all requirements. The multimode software supplied, provides all the new modes for the selected monitor type, including the now standard Computer Concepts modes. With VGA monitor, you are no longer restricted to a few modes. A WIMP application supplied on disc, allows new modes to be designed and existing modes to be modified for particular monitors.

Super VGA VIDC Card: This provides support for both VGA and Multisync monitors. A unique electronic design allows the horizontal and vertical sync to be buffered and have the polarity changed under software control **£45**

MultiVideo VIDC Card: As above but for MultiScan monitors only. **£25**

Listing Paper (Perforated)

- 1,000 Sheets 9.5" x 11" Fanfold Paper £7
- 2,000 Sheets 9.5" x 11" Fanfold Paper £11
- 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold £21
- 1,000 Sheets 15" x 11" Fanfold Paper £9
- 2,000 Sheets 15" x 11" Fanfold Paper £16
- 1,000 Sheets true A4 Fanfold Paper 70gms £11
- 2,000 Sheets true A4 Fanfold Paper 70gms £21
- Teleprinter Roll (Econo paper) £4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

Printer Labels

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	£6.00
1,000 90 x 36mm (Twin Row)	£6.25
1,000 90 x 49mm (Twin Row)	£7.50
1,000 102 x 36mm (Twin Row)	£6.75

Special Offer

Hitachi/Acorn 12" High Resolution, ergonomically designed Colour Monitors. Supplied complete with a swivel base and a BBC lead.

Only: £145 (While stocks last)

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
Brother HR15/20	£6.00	–
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Citizen 120D	£2.75	£4.50
DMP2000	£2.75	£4.75
EX800/1000	£3.50	£5.00
RX/FX80/85/800/MX80	£2.95	–
FX/MX/RX100/1000	£3.95	–
Kaga/Taxan KP810/815	£3.25	£5.00
LQ400/500/550/800/850	£3.25	£6.00
LQ1050/LQ2500	£4.00	–
LX80/86/800/850	£2.75	£4.50
LX400	£3.50	£5.00
M1009/GLP	£2.95	£3.75
NEC P2200	£4.50	£5.00
Panasonic KX1080/81	£3.25	£4.75
Panasonic KX-P1124	£7.50	£5.00
SQ2500	£23.00	£5.50
Star LC10/NL10	£2.75	£5.00
Star LC24-10	£2.95	£6.00
Olivetti Ink Jet Cartridges (set of 4)	£9	

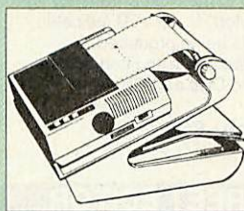
Our attractive Dust Covers are manufactured from translucent PCV. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081, 1592 & 1595 **£6**
P115 for KX-P1180 **£7** **P145** for KX-P1124 **£7**
P140 for KX-P1540 **£8** **P155** for KX-P1624 **£8**
Colour Ribbons for KX-P1081, 1592 & 1595 Brown, Blue or Red **£9 each**

Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £24 (carr. £3)
132 Column version £29(carr. £4)

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spaghetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments)

Connects	Serial	Centronics
2 to 1	£16	£17
3 to 1	£22	£24
5 to 1	£32	£36

(Cables extra at £6 each. Please specify type required when ordering)

2 Way Compact Printer Switch

A handy 2 way printer switch. Enables one micro to be connected to 2 printers or vice versa.

Centronics **£18;** Serial **£17**

(Cables extra at £6 each)

Auto Printer Sharer Switch

Connects	Serial	Centronics
2 to 1	£40	£45
4 to 1	£62	£59
8 to 1	–	£89

256k Multi Spooler

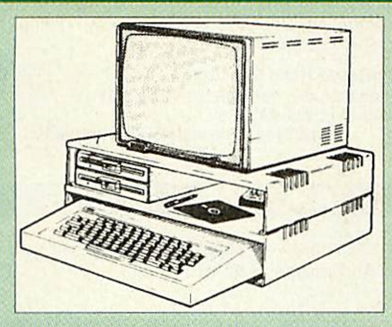
These Auto Centronics Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

- 2 In/2 out **£135**
- 4 In/2 out **£169**
- 8 In/1 out **£199**

Compact Converter Units

Serial to Parallel **£36** Parallel to Serial **£37**

Plinths for the BBC B & Master 128K Micros

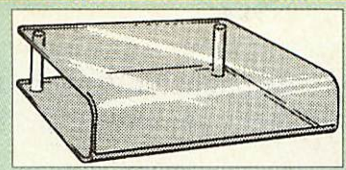


Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationery. The computer slides neatly in the lower section allowing easy access to remove the lid. Colour: Matching BBC Beige.

Single BBC Plinth	420 x 310 x 105mm	**£13**
Double BBC Plinth	420 x 310 x 210mm	**£24**
Single Master Plinth	490 x 310 x 105mm	**£14**
Double Master Plinth	490 x 310 x 210mm	**£26**

(Carr. Single plinth £2; double plinth £3)

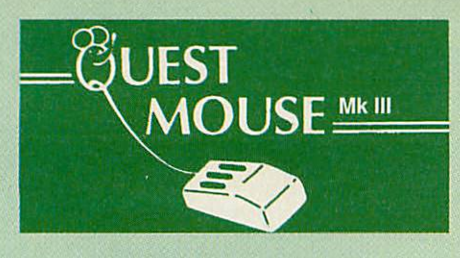
Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version **£16** (carr £3)
136 Column version **£20** (carr £4)

Continued→ → → → → → → → → →



- Quest Mouse III & Quest Paint £59
- Quest Mouse III, Quest Paint, AMX Stop Press & Pagefont £89
- Quest Mouse III only £30
- Quest Paint Software only £34
- Quest Font Disc (22 Text Fonts) £15
- Quest Mouse Mat (Red or Blue or Green please specify) £3
- Quest Colour Dump Disc – This new software allows you to print direct from Quest Paint to your Integrex Colour Printer £18

(P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software



Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

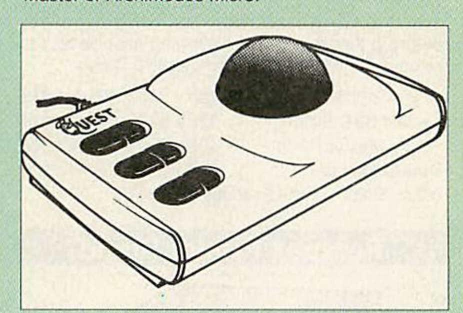
ConQuest ROM Package £30
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

ARCHI Mk II MOUSE

An extremely reliable replacement mouse for Archimedes Micro £32

Quest – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10 BBC/Master Version **£27**
QT-20 Archimedes Version **£30**

RB2 Marconi TRACKER BALL

RB2 (AMX/Quest compatible)	£45
RB2 including Quest Paint	£75
RB2-A for Archimedes	£46

THE NEW Mk III AMX MOUSE

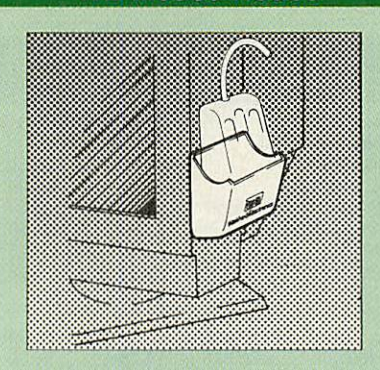
Inc. Super Art package

ONLY: £59 (carr £3)

(Please specify for BBC, Master or Compact)

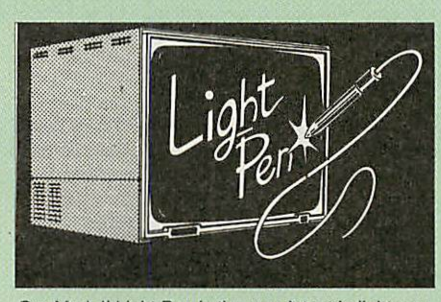
MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse	£32
PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£13
AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£20

WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive or desk.
It protects it from damage when not in use, yet within easy reach when you need it again. At £4 it does not cost a rodent's ransom.

Price £4



Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £21

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Admin Xtra Disc Utility	£13
Fonts N Graphics Disc Utility	£13

BEEB VIDEO DIGITISER



"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro. This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket. The software supplied includes a sophisticated, fast screen dump routine.
Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

£109 (Carr. £5)

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

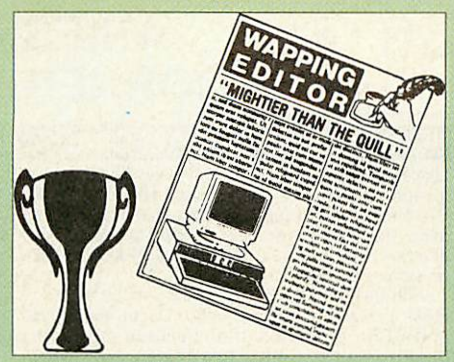
The Beeb HandScan

Hand-held Scanner for the BBC Micro



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer the BBC Micro computer.
The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.
All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware £135



Winner of the BBC Acorn User 1990 Award for the Best DTP/Word Processor

The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, eclipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individually proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.
Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser.

Wapping Editor Software Pack £69
Wapping Editor plus Mouse £89

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)



At the request of many of our customers we are now able to offer training in the use of Wapping Editor DTP package. For further information please telephone 0923 37774 and ask for Tim or Shiraz

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

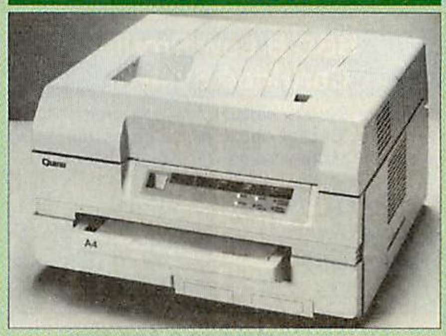
Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions. **£12**

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only). **£13**

Laser Direct



By using the power of the Archimedes RISC processor, it offers the best of both worlds – print speed up to 5 times faster than typical Laserjet compatibles – uses outline fonts so that any font can be scaled to any size – works with all programs that use RISC OS printer drivers. Ideal for use with Genesis, !Draw, Acorn DTP, Impression, etc. Includes 50 sheet paper tray and a single sheet/envelope tray. Requires one expansion slot and at least a 2Mbyte Archimedes. A very compact printer, a very low initial cost and very low running costs.

Special Price: £849

- Special High Res Laser Direct Card 600 DPI for Canon LPB4 Laser Printer **£325**
- LPB4 Printer plus High Res Card **£1025**

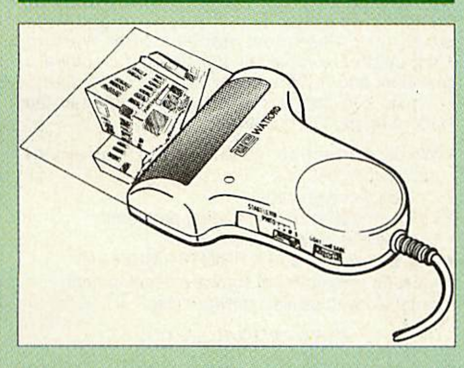
(For demonstration, call in at our retail shop)



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

All prices are exclusive of VAT

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £149. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scaling to any size including stretching and squashing in X and Y direction separately.

Colour tinting.
X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

AHS-4 Archi 300/400 Version £149
AHS-3 Archi A3000 Version £175

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16K Disc Ram Module

(16K Sideways RAM Module)

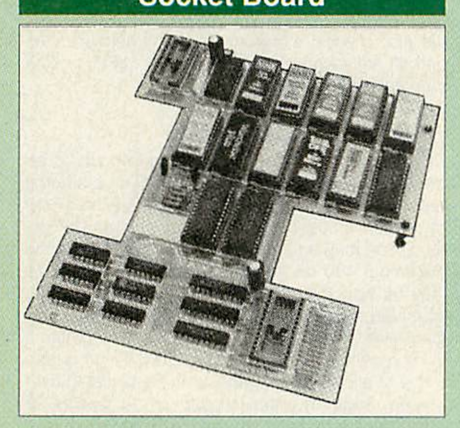
Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances)
- Compact construction
- No overheating or overloading problems.
- Free utilities disc supplied
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£29** (carr £2)

Optional Battery back-up fitted £3

Solderless Sideways ROM Socket Board



The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:

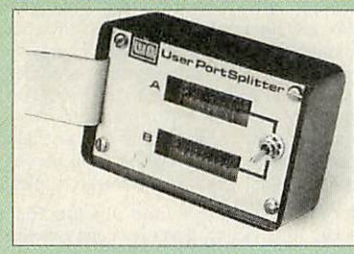
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery Backup fitted **£39**
Battery Backup only **£3**
16K Sideways RAM **£8.50**
(carriage £3)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

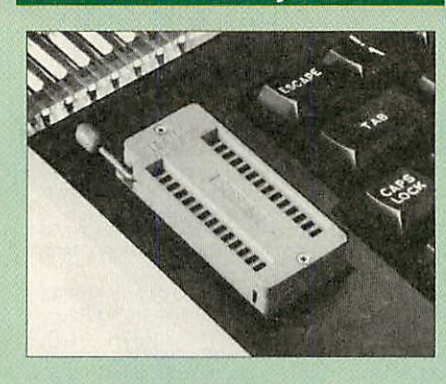
User Port Splitter Unit



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at **£22** (carr £2)

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for professionals and Hobbyists alike.)
- BBC, B and B+ compatible.

ONLY **£18** (carr £3)

BBC B Low Profile Cartridge System

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

• Complete System	£11
• Spare Cartridges	£2.75
• Spare Rack	£1.65

ROM Cartridges for the BBC Master

Will accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc

Twin **£9**; Quad **£14**

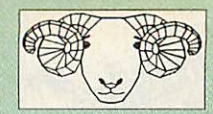
Commander Joystick

Watford Electronics' new Commander Joystick for the BBC B and Master 128K has a unique dual mode of operation giving selective free floating or self centring fully variable control in both X and Y axis directions. Commander is particularly good for flight simulation and drawing programs.

Features:

- Direct connection to BBC Analogue input port – no interface needed.
- Fully compatible with all BBC Joystick controlled games programmes.
- Switchable springs allow selection of floating or centring operation.
- Trim adjusters for both X and Y axes for fine centre adjustment.
- Convenient stick mounted fire button with additional base buttons.

Launch Price: £15



ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Cobal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved ★FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on you BBC micro – no flying leads to connect and no soldering. Provision of the onboard ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£69** (carr. £3)

Aries B-12 Sideways ROM Board

The B-12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost

Price:	Aries B-12	£36
	Aries B-12C	£5

Aries B-488 IEEE-488 Interface Unit

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB or 'HP IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

Voltmace Joysticks

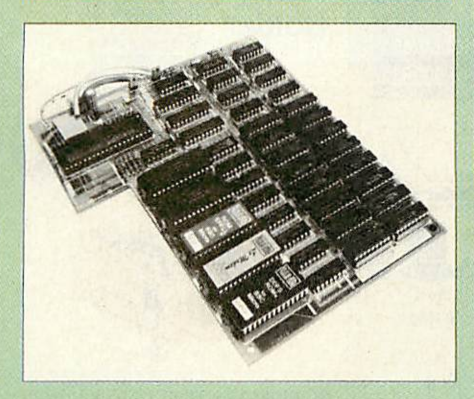
Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7
Delta-Cat A mouse eliminator Joystick for the Archimedes	£24

Delta Base B



Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128 £25

ROM/RAM Card



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 7 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

PRICES:

- ROM/RAM card with 32k dynamic RAM **£48**
- ROM/RAM card with 64k dynamic RAM **£65**
- ROM/RAM card with a massive 128k dynamic RAM **£109**

(carriage on ROM-RAM Card £3)

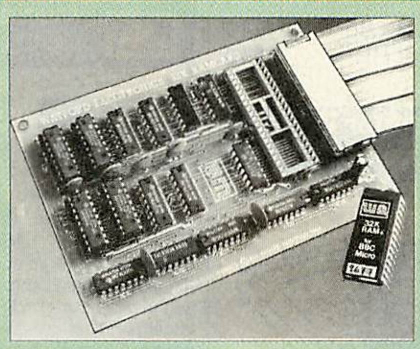
OPTIONAL EXTRAS:

16k plug-in Static RAM kit	£9
16k Dynamic RAM for Upgrade	£13
Battery backup	£3
Read and Write protect switches	£2 each
Complete ROM-RAM board All options installed	£115

P.S.

IS your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford, ROM/RAM Board and pay £5 less.

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16k or even 20k, but a massive 32k of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.

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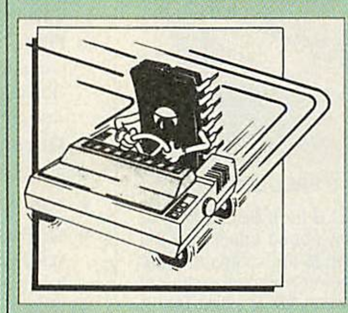
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Epson FX & RX 80	£10
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View Printer Driver ROM



View is a powerful word processor, but it seriously lacks in terms of printer driver support. With the View Printer Driver ROM, the View users will find themselves in the realms of advanced word processing.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built-in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redifinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute ★ command when printing.

Other features include a very powerful on-screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory-based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips.

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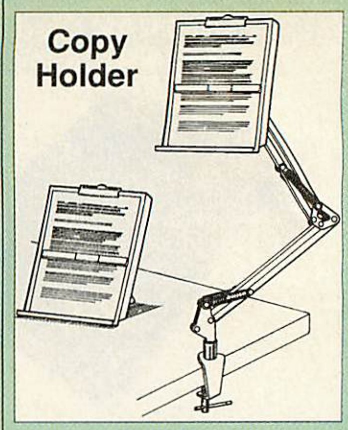
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The Epson RX/FX/KAGA Printer Commands Revealed Handbook

Printer Commands Revealed

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However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

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This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from Basic and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

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'ACORN TO PC' is written clearly and concisely by Dr. John Lockley, who has wide experience of writing and broadcasting. He is currently appearing as a regular contributor on Radio 5, and is co-author of 'The Complete BBC Computer User Handbook'.

Price: £15.95 (No VAT)

The Complete BBC Computer User Handbook

If you own a BBC B, B+, Electron, Master 128 or Master Compact, or Archimedes, then this is the book for you. It shows how to get the best from your machine, and how to make it work for you. The general style and level of presentation means that both the expert and beginner alike will feel comfortable with the quality and quantity of the material.

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It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

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(Now reads Archimedes Discs)

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Beeb DOS is a collection of utilities which run on the PC's and enable it to read and write information on BBC discs. You can transfer files between your PC's 360K floppy, high density floppy or hard disc and your BBC discs. In addition Beeb DOS allows you to catalogue, format and compact BBC discs and delete, re-name, lock and unlock BBC files, all on PC's. Each Beeb DOS utility is written in IBM assembler and is run directly from PC or MS-DOS. The Beeb DOS utility can be run from floppy disc, hard disc or RAM drive.

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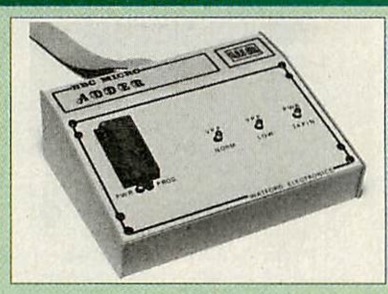
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Master Casing	£49	Power Supply	£59

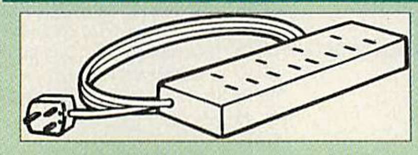
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Fitted in place of your normal mains plug, this device protects your equipment (and data from corruption), against mains high voltage translent spikes/surges caused by lightening or thermostats switching.

Protection for only **£8.50**

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SOLDER type **£1.50** IDC CRIMP type **£1.95**

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Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ keyboard

Only **£1.00**

28 pin ZIF SOCKET (Textool) **£6.95**

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(All ready made and tested)

CASSETTE LEADS 7 pin DIN Plug	
to 3 pin DIN Plug + 1 Jack Plug	£2.50
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Supply from BBC power supply to standard Disc Drive Connection: Single **£3.00**; Dual **£3.75**

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BBC to Disc Drives Ribbon Cable Single **£4** Twin **£6**

Miscellaneous Connectors

	Plugs	Sockets
RGB (6 PIN DIN)	50p	75p
RS423 (5 pin Domino)	70p	80p
Cassette (7 pin DIN)	40p	95p
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Paddles (15 pin 'D')	150p	250p
Disc Drive Plug 4 way	100p	–
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Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below). **£14**

Watford POWER DUCK £8

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27512-2	£4.50
27C101G (1 Meg)	£7.00
4013	75p
4020	£1.00
4164-10	£1.55
4464-10	£3.50
4816 RAM	£2.00
41256-8	£2.00
41256-10	£1.50
6264LP-8K	£4.00
6502A CPU	£5.00
65C02 3M	£9.75
65C12	£9.00
6512A	£10.00
6522	£4.00
6522A	£5.00
62256ALS-15	£10.00
62256P-12	£8.50
6818	£4.00
6845SP	£6.00
68B50	£2.95
68B54	£7.50
7438	50p
74LS00	50p
74LS04	50p
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74LS393	£1.00
75453	£1.00
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Assorted ROMS



ACORN ADFS	£25
ACORN BASIC 2 plus User Guide	£22
Acorn BCPL	£42
ACORN DNFS	£17
Acorn FORTH	£32
Acorn Graphics	£25
Acornsoft C Disc	£36
Acorn LISP	£19
Acorn OS B+	£25
Acorn OS 1.2	£14
Basic Editor	£24
BBC PCB Designer	£49
Beebmon	£22
Buffer & Backup	£20
Communicator	£49
Dump Out 3	£25
EPSON NLQ ROM	£25
Graphics Extension Rom	
GXR-B	£21
GXR-B+	£22
ICON Master	£28
Logotron LOGO	£43
MASTER OS ROM	£38
Master ULA (47)	£15
Master ULA (60)	£10
Micro Prolog	£25
Microtext Disc	£46
Microtext Rom	£199
NLQ DESIGNER	£25
Numerator – Archi	£69
Numerator – BBC	£39
Pendown ROM	£32
Rom Manager	£20
ROMIT	£29
SERIAL ULA	£13
TED	£35
Termulator B, B+	£28
Termulator Master	£32
Video ULA	£14
ULTRACALC II	£26
1Mb OS ROM	£39

Hi-Speed, Low Cost IDE Hard Disk Drives for Archimedes

Watford's NEW Innovative IDE interface card brings the latest advances in PC hard disc technology to within reach of the Archimedes user. Over the last few years PC hard disc manufacturers have been working towards the goal of integrating the drive controller onto the hard disc, eliminating the need for an expensive controller card.

Now this has been achieved and drives are available under names such as IDE (Integrated Drive Electronics) or ATA (AT Attachment). These drives require only simple interfacing to a PC motherboard and reduce the overall cost of installing a hard disc. Because of the integration of the controller and drive electronics onto one compact board, manufacturers have been able to include extra features into the drive, such as Caching, where tracks are buffered in fast memory, reducing access times and increasing throughput. All these benefits make IDE drives far more attractive than conventional ST506 drives or SCSI.

Watford's advanced interface allows IDE drives to work on any Archimedes machine, speeds in excess of SCSI devices can be obtained at a fraction of the cost of a SCSI drive.

Up to four drives are supported by the IDE filing system IDEFS, up to two drives can be attached to each expansion card, up to four cards can be installed in a machine. An optional 20Mb or 40Mb hard disc can be supplied on the podule expansion card itself, with its fast transfer rate and power saving modes the drive is ideal for storing commonly used software such as the !Fonts application.

A powerful security feature has been provided with the two unique commands *IDELock and *IDEUnlock, ideal for educational establishments wifere hacking or tempering may be prevalent that may lead to loss of data. Once locked, the configuration can not be changed until a secret password is used. The !IDEForm Write Protect option is particularly useful in conjunction with *IDELock as it will prevent any unauthorised deletion of data.

By an innovative use of on-board memory, the card will remember its configuration, even if moved to another slot or even a different machine, this also includes the unique security features.

Hardware

- Single width EuroCard
- Supports proposed ANSI ATA (IDE) specification
- Fast 16 bit MEMC interface interrupt driven to support background disc operations
- 5 Mbytes per second peak transfer rate
- Built in Non Volatile RAM to hold configuration
- LED activity indicator
- 37 way D type socket for external drives
- Optional on-card 20Mb or 40Mb hard disc
- Up to two drives (master and slave) per card
- Multiple cards per machine (up to four)

Software

- Conforms fully to the Acorn IDE Specification
- All software supplied in ROM
- Filing system 'IDEFS'
- Desktop filer with drive ready detection and disc name under icon

cont./-

- !IDEForm, WIMP based configuration and formatting software
- Drives can be individually write protected
- Up to four drives over multiple cards
- Power saving standby modes supported with configurable timeout
- Drives can be used without translation in native mode for minimum overhead
- !IDEFSDisk, creates PC emulator hard discs

*Commands

*IDELock
*IDEUnlock
*IDEFS
Selects the IDE filing system 'IDEFS'.
*IDEDrives
Displays the configuration and native characteristics of installed drives.
*Configure IDEFSDirCache
*Configure IDEFSBuffers
*Configure IDEFSDrive

Typical transfer speeds

Prairie Tek	20Mb	650K bytes per second
Seagate	43Mb	800K bytes per second

Prices

Part No.	Capacity	Access Speed	Price
ADA 0520	44Mb	28mS	**£249**
ADA 0530	89Mb	19mS	**£395**
ADA 0540	130Mb	19mS	**£599**
ADA 0550	142Mb	15mS	**£699**
ADA 0570	200Mb	15mS	**£790**
ADA 0580	330Mb	15mS	**£TBA**
ADA 0590	670Mb	15mS	**£TBA**

All the above drives are supplied complete with Controller Card, cable & Software on ROM. (Internal fitting)

Ideal for use with A300/A400/A500 Series machines.

For A3000 users an additional external Case and PSU will be required.

AAA 0300 External Case & PSU for Above **£85**

Internal Hard Disc Drives for A3000

ADA 0700	21Mb	23mS	**★£315**
ADA 0720	44Mb	28mS Available Soon	**£TBA**
ADA 0730	89Mb	18mS	**£TBA**

Supplied complete with Podule, Fan, Cable & Fitting instructions.

★ Tentative Launch Price

Hard Cards

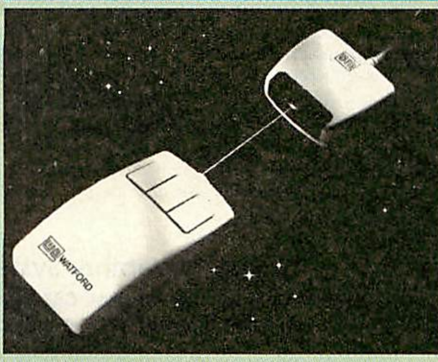
Hard Disc on Cards for Archimedes

2.5" Hi-Speed Hard Disc Drive on a controller card.
"Simply plug and play"
For Archimedes A300 and 400 series machines

ADA 0650	21Mb	23mS	**£345**
ADA 0660	44Mb	28mS	**£495**
ADA 0670	89Mb	18mS	**£TBA**

(Can be used as a Removable Hard Drive)

NEW Archimedes Cordless Mouse



Ever found that using a mouse on a busy desktop has its problems? The cable is always being caught up in papers, tangled round equipment and other cables etc, and what about that cup of coffee spilled over your work!

Watford Electronics' new Cordless Mouse solves these problems by removing the cause for concern - replacing the cable with a simple infra red link. It still provides all the speed and easy control of a conventional mouse, but with complete freedom. In use, there are no operating differences between the standard mouse and the new cordless mouse so all mouse functions and mouse driven RISC software will be fully compatible. Pinpoint accuracy is ensured by a unique Accelerator button, which, when pressed, moves the pointer by just a tiny amount for a large slow movement of the mouse, but by a large amount for a quick wizz of the mouse.

Features
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- High Resolution 200 DPI
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- Power - by two AAA size batteries (not included)
- Automatic Standby Mode after 5 seconds inactive
- Auto Power Shut-Down after 20 seconds inactive

Price £79

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★PRIZE £50★

EIGHT- BIT ATOMS

B B+ M C E A

Readers of the erstwhile Risc Revue will be familiar with a game called *Atoms* – written for the Arc by Adrian St John. **Garry Quested** of Herne Bay has supplied a version for Beebs, Masters and even Electrons. You'll find the two listings needed on the yellow pages.

The game is a faithful adaptation of the original and the computer-player uses the same algorithm as supplied by L C Howe in June's Risc Revue. To play first enter and run *MakeAts*. This assembles some machine code and other data, saving the result as a file called AtCode. Now enter and run the main game – *Atoms8*. This loads the AtCode file and produces a display similar to the Archimedes version.

You are provided with a simple menu screen. To select the number of players press two to six. Each player can be computer or human controlled. The setting is marked by a C or H on the colour for that player. To change the setting use the cursor keys to move the arrow to the desired colour and press RETURN to toggle the control setting. When you are ready to start press S.

Players take turns to place atoms of their own colour on the board. You can put an atom on any empty square, shown as grey, or add one to a square of your own colour. When the number of atoms in a square exceeds the critical value an explosion occurs. One atom flies out in each direction, horizontally and vertically, converting the square it reaches to its own colour. The initial explosion may cause a chain reaction as other squares become unstable. The object of the game is to remove all your opponents' atoms from the screen. The critical value of a square depends on where it lies. Corners have a value of two, side squares three and central squares four. The value is the number of adjacent squares.

Garry's program works in mode 1, leaving little memory free for the game. That is why the code and other data has to be loaded in. You cannot use shadow memory when running the game as part of the code directly pokes the screen memory and PAGE should be no higher than &1100 when you CHAIN "Atoms8".

He employed various cunning devices to make the game look pretty on a Beeb. Mode 1 provides good screen resolution but the limited colours means that some work is needed to produce the range of colours required. Squares are plotted by the .showatom routine which is provided with a pair of bytes to describe the colour. The atom squares are stored as white with black dots and the byte pair is ANDed with this uncoloured image to produce the appropriately coloured square. *Atoms8* shows that red, white and blue can be mixed to produce a nice variety of hues.

The locations of the machine-code routines and board data are passed to *Atoms8* in the first part of the AtCode file. The board consists of two 70 byte blocks of memory – one containing the number of atoms in each square and one their colour.

If you run *Atoms8* with six computer players it will play as if you had run the Archimedes version, a good test of the faithfulness of the adaptation! It is quite easy to add a random element to the Arc version, although it will take a bit of machine-code, or a random number generator at the least, to do the same for the Beeb program. The extra lines needed for the Arc version are given as *AtomRand*. Add these to the original game from the April and June issues.

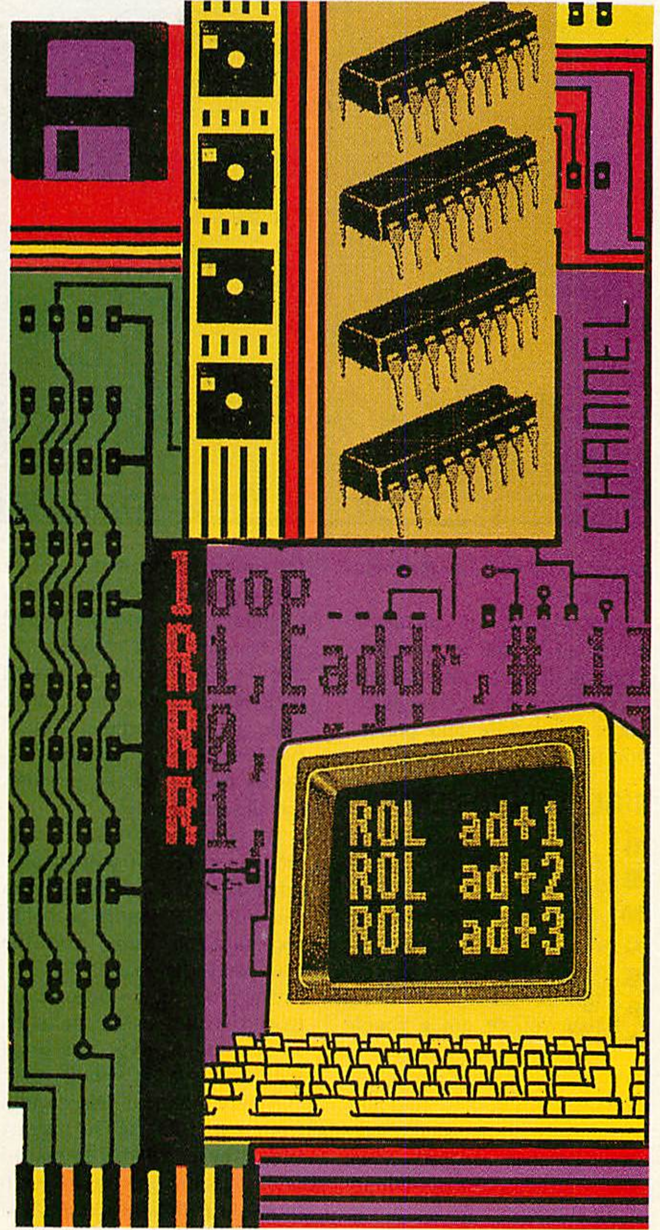


Illustration by Andy Lovell



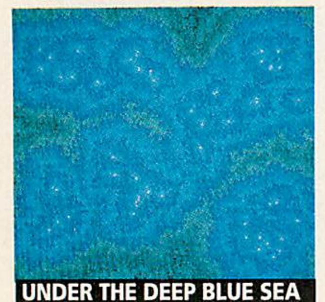
UNDER THE SEA

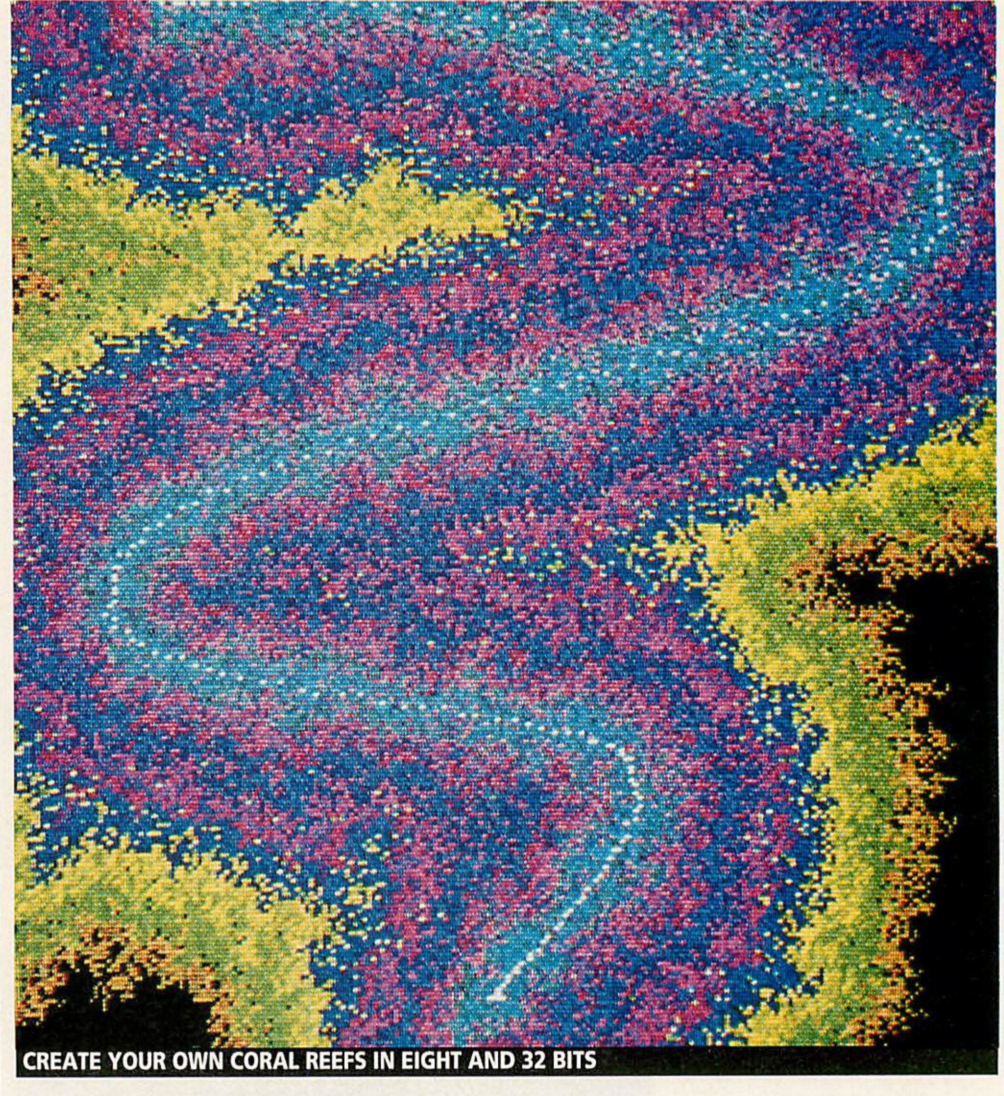
Hot on the heels of last month's nature theme is *Coral32*, a submission from **Jan Vlietinck** in Belgium. This simulates the growth of coral to produce some very attractive results. It takes a start pattern, generated by the computer or drawn with the mouse, and randomly encrusts it with colour. Jan's program was written for the Archimedes, but as usual we've come up with an eight-bit version called *Coral8*.

When run the Archimedes version draws a square box on the screen and will allow you to draw an initial pattern by moving the mouse, holding down the left button. Pressing the right button will produce a random smattering of pixels around the pointer, rather like an airbrush. When you are happy with your pattern press the middle button to start the growth stage. A mouse click when the plotting has finished will re-run the program.

As the BBC has no mouse the eight-bit version plots 10 random points for its initial pattern. If you have an AMX or Quest mouse you may like to add a suitable code to allow a user pattern to be entered.

The program works by picking a random point on the screen and, if it is black, checking the surrounding eight pixels. If any one of these is not black it will colour the original point. The actual colour used is picked by a very contrived calculation in the 32-bit version and a relatively simple one in the eight-bit version. In essence, a certain colour is used for a fixed number of pixels. The 32-bit version is more complicated because it makes use of 256 colours, compared to the eight-bit's seven.


UNDER THE DEEP BLUE SEA


CREATE YOUR OWN CORAL REEFS IN EIGHT AND 32 BITS

Luckily all this calculation is hidden so that all you have to do is don your snorkel and flippers, put a piece of velcro under your nose and pretend you're Jacques Cousteau...

BIGGEST AND BEST

**Biggest* is a utility to find large files, directories and applications. If you suddenly find yourself running out of space on your hard disc, running this program may reveal that you've got a couple of files of a megabyte or more that you don't need. You can use **Biggest* to find any particularly overloaded directories, or even to track down your most storage-hungry applications.

It has been written in Basic for simplicity but makes use of two operating system calls, including OS_ReadArgs covered in last month's *INFO, to allow parameters to be passed to it as if it were a machine code utility. To run it simply type *Biggest, optionally followed by any of the parameters described below.

If you supply the single parameter -help, it will display a list of all the parameters you can give it – you'll probably recognise the format from the *EveryWhere command.

The program has been set up to run with sensible defaults, so if you just type *Biggest it will recursively search your currently mounted disc starting from $ to find the 30 biggest files. These will be displayed in descending order along with their full pathnames, types and sizes. Supplying the Number parameter allows you to change this default of 30. This was picked so as to fit the final list comfortably on a mode 0 screen, but you may well have a multisync or 19in mono monitor and be able to display 60 or more.

The next two options Type and Exclude let you select more precisely which files you want to count. Both can be followed by a single file type name such as Basic or a type number like &FFB or a list of types separated by semicolons, for example – Text; &DDC; Sprite. Type specifies the files you want to count and Exclude will count all except the ones you supply. For obvious reasons, you cannot supply some of each. As an alternative to these two options you can supply either the Applications or the Directories flag.

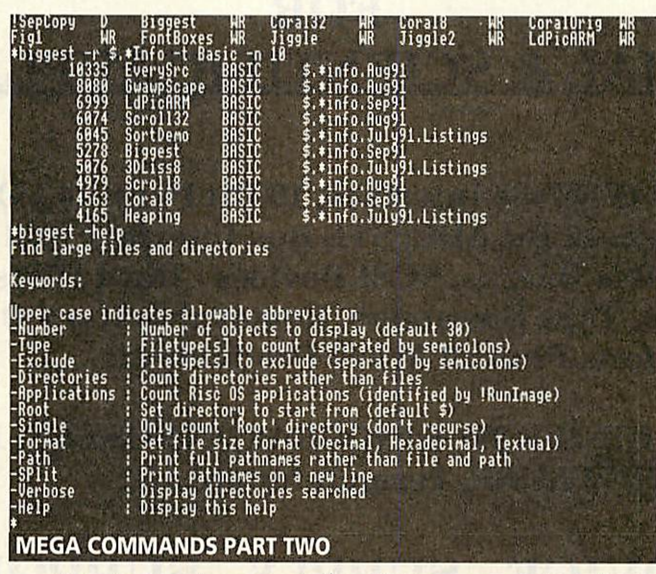


As Risc OS applications are not single files but whole directories you cannot simply specify a file type to the Type parameter. The Applications flag recognises a Risc OS application if a directory contains a file called RunImage. In this case the size of the files within that directory are added up. It is by no means law to have a file called RunImage, so *Biggest* can't be totally foolproof; it just does the best it can. The program functions a little differently if the Directories flag is used. No recursion is used, so only the directories in the root are dealt with. Instead of counting files individually, the size of all the files within each directory in the root are added up, and the directories are ordered according to their total size. This is like doing *Count R for each directory.

As mentioned before, the program defaults to starting its search at $. This can be changed with the Root parameter. Note that in *EveryWhere this was Directory. We have now changed *EveryWhere to accept Root instead. In the example of *EveryWhere below we have used Root, so to change your copy simply change the "directory/k," in line 3410 to "root/k," and the "Directory" in line 3670 to "Root" then re-run the program to assemble the code. You should also change the D in last month's *Lock and *UnLock examples to R to maintain compatibility.

Next on the list is Single. This switches the recursion off and will just count the files within the given root. Directory sets this automatically. Format allows you to change the way the file sizes are printed; Decimal, Hexadecimal and Textual, or any abbreviation thereof, are allowed. The first two should be self-explanatory; the last is the approximate form used by the *EX command.

If the Path flag is given, then the full path name of each file will be printed in the final output rather than the file name and the path name to it. This reveals a rather nasty display problem – what if the resulting output is longer than 80 characters? Well, there's not really much that can be done,



```
!SepCopy   D    Biggest   WR   Coral32   WR   Coral8    WR   CoralOrig  WR
Fig1       WR   FontBoxes WR   Jiggle    WR   Jiggle2   WR   LdPicARM   WR
*biggest -r $.*Info -t Basic -n 10
     10335  EverySrc    BASIC     $.*info.Aug91
      8080  GwawpScape  BASIC     $.*info.Aug91
      6999  LdPicARM    BASIC     $.*info.Sep91
      6074  Scroll32    BASIC     $.*info.Aug91
      6045  SortDemo    BASIC     $.*info.July91.Listings
      5278  Biggest     BASIC     $.*info.Sep91
      5076  3DLiss8     BASIC     $.*info.July91.Listings
      4979  Scroll8     BASIC     $.*info.Aug91
      4563  Coral8      BASIC     $.*info.Sep91
      4165  Heaping     BASIC     $.*info.July91.Listings
*biggest -help
Find large files and directories

Keywords:

Upper case indicates allowable abbreviation
-Number       : Number of objects to display (default 30)
-Type         : Filetype[s] to count (separated by semicolons)
-Exclude      : Filetype[s] to exclude (separated by semicolons)
-Directories  : Count directories rather than files
-Applications : Count Risc OS applications (identified by !RunImage)
-Root         : Set directory to start from (default $)
-Single       : Only count 'Root' directory (don't recurse)
-Format       : Set file size format (Decimal, Hexadecimal, Textual)
-Path         : Print full pathnames rather than file and path
-SPlit        : Print pathnames on a new line
-Verbose      : Display directories searched
-Help         : Display this help
*
```

MEGA COMMANDS PART TWO

except to buy a bigger monitor! However the Split flag is provided to ease the situation. If present, the path name will be printed on a new line after the file size and type.

The final twiddle you can give is Verbose. This does not effect the final output of the program in any way, it merely provides a mug watch.

We thought that eight-bit users might find a version of **Biggest* useful. Many will use ADFS as their main filing system and those with Econet could certainly find such a utility helpful. The eight-bit program *Big8* is a menu-driven affair that runs in mode 7 as quite a lot of Ram has to be set aside to store full pathnames.

Upon running *Big8* you are presented with the main menu. The first option is Start search which begins the counting process. To select which directory to search, the default being $, select the second option on the menu and enter the pathname.

Although file types are not officially implemented on eight-bit machines, it is often possible to spot certain sorts of file by looking at their load and execution addresses. If you select the third option on the main menu you will be given a list of possible types to search for.

The All files option is self-explanatory. Directory when selected will cause directories rather than files to be counted – just like the Arc version. This may be useful to Econet managers who want to find out which users are guilty of gobbling up the most storage space. The remaining options can be selected individually. You may look for one or more at a time – an arrow to the left of an item indicates whether it will be searched for.

The file types are stored as a list of names in DATA statements at the end of *Big8*. Each type has a corresponding function with the same name, but if a file type is more than one word long only the first word is used for the function name. It is easy to add your own type to the list. Simply include the name in the list before Other and add your own function.

Each function takes as its parameters the load and executions addresses of a file and its size. It then checks these to see if they are consistent with the particular file type and then returns TRUE or FALSE accordingly. For example, FNScreen looks for mode 0, 1, 2, 4 and 5 screens. These will either have load addresses of &3000 or &5800 and a corresponding length of &5000 or &2800. It is perfectly possible to save a screen with different addresses – the absence of official file types means that *Big8* can only provide an approximate guide.

The Verbose and Recurse options may be toggled on and off. In Verbose mode the five biggest files are shown as full pathnames, load and execution addresses, size in bytes or K, and suspected type if appropriate. Without the Verbose option the 20 biggest files are shown with their sizes in bytes. Any pathnames too long to fit on the screen are truncated and prefixed with '...'.

The Recurse option is normally on but may be switched off if you just want to look at the files in a directory and ignore any subdirectories. It is irrelevant if you have selected type Directory. Press ESCAPE at any time to return to the menu.

One feature of *Big8* which deserves a mention is its use of linked lists. The Arc can shuffle the contents of arrays very easily, but moving filenames and other data about on a Beeb can take a long time. For this reason the information for each file displayed by *Big8* is inserted into a list. The first entry, that is the smallest file shown, has entry number list% and the array next%() is used to store the position of the next biggest file. The value in next%() for the biggest file of all is -1, indicating the end of the list. In this way, no unnecessary memory shuffling need be done when a new file is found – the contents of the pointers in next%() are simply altered.

Incidentally, *Big8* is not compatible with DFS. It is only really worth running it if you have a large directory structure, and DFS discs don't have proper directories.

LOCAL CALLS

B B M C E A – If you have moved onto the Arc from a Beeb or Master you may not yet have discovered all the extra facilities Basic 5 has to offer in the way of local variables. On the Beeb it was generally only possible to pass named variables to FNs and PROCs eg, fred$, jim%. The Arc allows many other sorts of variables to be used locally though. Arrays can be given as parameters and, perhaps even more surprisingly, so can memory locations. *LocalTest* illustrates the idea.

Three pieces of information – a byte, a word and a string – are all stored in a block of memory and displayed. A procedure is then called with different values and these overwrite the original ones. However, because the parame-



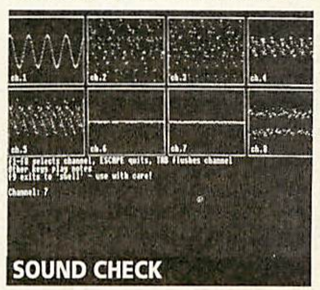
ters given in a DEF statement are local, the original values are restored when the procedure comes to an end. Apart from its value in terms of consistency of variable types, this feature is particularly useful when defining procedures that pass on parameter blocks. For example, many Wimp calls, like SYS "Wimp_OpenWindow", require large blocks of data to be prepared. The parameters can simply be passed straight into a block of memory without fear of changing the original contents, like this:

```
DEF PROCopen(!q%,
  q%!4,q%!8...)
SYS "Wimp_
  OpenWindow",,q%
ENDPROC
```

MAKING WAVES

John Grayley has provided a graphic demonstration of the Arc's sound system in action. *Wave* displays the waveforms of all eight sound channels as they are playing. With care you can run your own sound programs and watch their output.

Run the program and eight boxes will appear – each containing a display of the current output of a voice. To play a note press a key on the main keyboard which has been set up to imitate an organ. There are two manuals – from Z to / and from Q to \. These form the



SOUND CHECK

white notes and the black notes are found in the rows above. To select which channel to play on press F1 to F8. You can also flush the current channel by pressing TAB – this will kill the current sound, leaving a snapshot of its waveform on the screen.

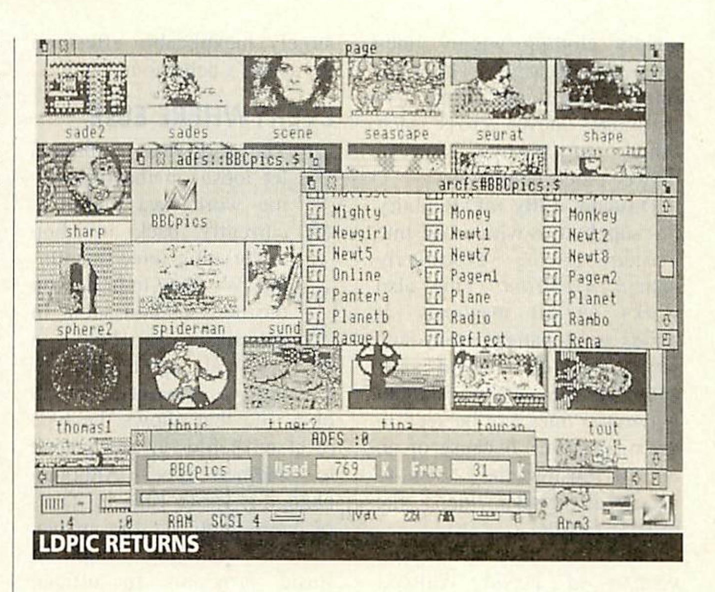
To quit press ESCAPE. Alternatively press F9 which provides a Basic shell. In fact this simply moves PAGE up above *Wave* so that the code to do the plotting is left intact. If you are careful you can run your own program. Any sounds produced will be shown in the boxes. Note that you must remove any lines from programs which might cause the screen to be corrupted, eg, any mode changes. You should also press CTRL-BREAK when finished to be safe.

The program is as legal as it can be, considering what it does! For example, the official start of screen memory is read for the plotting routine to use. However, several adventurous techniques are employed to allow the waves to be shown. Everything revolves around the redirection of certain branch instructions in the headers of the Arc voice generators. *Wave* calls the original routine and then uses the sound data to plot the graph. It is assumed that the addresses of the voice generators are stored consecutively &40 bytes into the sound system data block, and this is how the program finds the locations of the branches it must redirect.

AHHH... LDPIC!

Long standing readers of *BAU* may remember a cunning BBC screen compression utility called *SvPic*. It was first published in October 1986 although it made its debut on the *BAU* Gallery Disc long before that. We recently came across a lot of BBC screens compressed with *SvPic*. Instead of decompressing them on a Beeb, transferring them to the Arc and tediously converting them, I wrote some Arm code to do it all for me. The result was a utility type file called *LdPic which decompresses any BBC screen in *SvPic* format and converts it to Archimedes mode 12. From here the screen can be *ScreenSave'd. I archived all the pictures I had with *Spark* and included an index sprite generated by Chris Ruseman's *PicList* application from a couple of months back. To use it just type *LdPic followed by a filename.

Expanding data onto an alien screen layout was far from trivial. In the end I kept a track of the BBC screen



LDPIC RETURNS

address and converted it to an Archimedes address whenever a pixel had to be plotted.

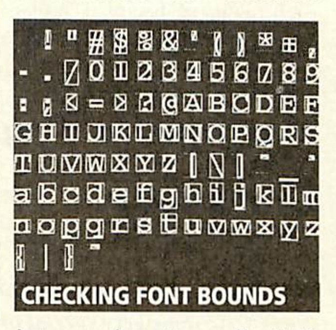
Separate routines had to be written for converting the different BBC modes because of the various ways the screen memory can be laid out.

A general purpose routine could have been written, but it would have probably been longer than the 50 lines used here.

LITTLE LAMBS EAT IVY

I recently wrote a program that generated a drawfile and needed to centralise letters within boxes. So I duly consulted the PRM to find the appropriate SWI to find the width of a character. There are three possible calls which all do subtly different things. It was only after writing *FontBoxes* that I found the differences. Font_StringWidth is a complex SWI that will split a string intelligently, and can cope with font and colour changes. It is more attuned to text formatting than simple width calculation. On the surface the other two are very similar. Font_StringBBox returns the bounding box of a string and is the call I originally used to centralise my characters; Font_CharBBox returns a character's bounding box.

The important difference is that Font_StringBBox takes into account any extra padding around characters to make them monospaced for example. Font_CharBBox merely returns the maximum extent of the character itself. Its width can then be found by subtracting the minimum x from the maximum x as returned by the SWI. This is the call I actually used. The program *FontBoxes* demonstrates the difference



CHECKING FONT BOUNDS

between these two calls. Both sorts of bounding box are ascertained, StringBBox is plotted in red and CharBBox in green.

To see the characters correctly anti-aliased, you'll need to have *FontMax2* configured to around 40.

SMALL WONDERS

We have three one-line wonders for your delight this month. *Jiggle* comes from **Donna Parry** of County Durham, building on her earlier success with *Wiggle* in the last ever Eight Bits column. It works on all machines and can be entered without using keyword abbreviations. The picture produced has a curious, three-dimensional appearance and is made up by



simply plotting wiggly lines from left to right. The only rule to keep things in order is that lines never cross each other but always squeeze between their neighbours.

Duncan Lilly of Banbury has supplied us with a one-line masterpiece he evocatively named *EyeStrain!* This also works on all machines. It builds up a pattern from sine waves, by plotting them vertically up the screen. Parallel horizontal lines can be seen in the picture but, because of an optical illusion, they seem to get closer together – hence the program's title.

Finally we have an updated version of David Walters' amazing *String Thing* one-liner – see Risc Revue, May 1991. The enhancements come courtesy of **Ray Porter.**

He has added colour to the original and allowed the size of the string creature to be changed with the left and right mouse buttons. If you reduce its size enough the radius of each segment becomes negative. This has a curious and largely inexplicable effect on the string's behaviour.

EVERYWHERE ELSE

B B M C E A The *EveryWhere command let loose on the unsuspecting world last month is currently back in shop undergoing some fine tuning. We hope to bring you the new version soon. In the meantime, here's a practical application of the utility. *ChangeType is an obey file that allows the type of a set of files to be changed to another type. Although changing sprite files to Templates is not, on the whole, useful, changing eight-bit Basic programs to official Archimedes type Basic is. This led to the creation of *ChangeType. As load addresses are not generally needed by Risc OS, it stores the file type in bits eight to 19 inclusive of the load address. A Basic program saved on an eight-bit machine has a load address of say &FFFF1900. Such a file will appear to Risc OS to be of type &F19. To change it to Basic you would normally use:

```
*SetType <file> Basic.
```

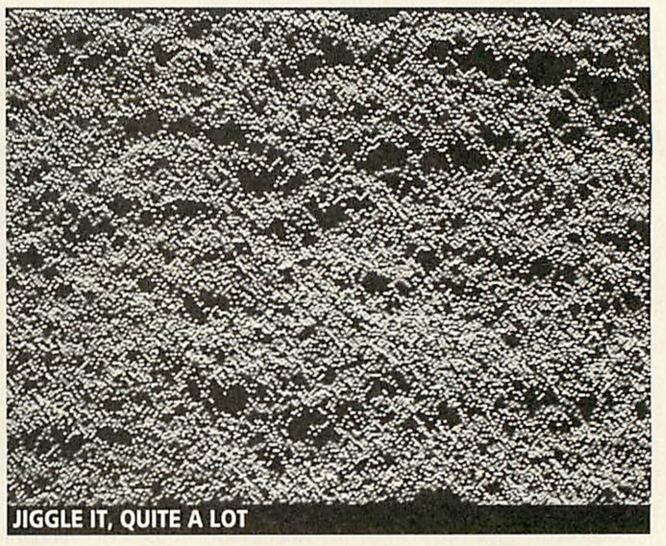
*ChangeType takes three parameters: a directory name and two file types. All files of type 1 within the given directory are changed to type 2. So, to change all eight-bit Basic files to Archimedes Basic files in directory $.Progs you could use:

```
*ChangeType $.Progs &F19 Basic
```

and save yourself a lot of trouble. We suggest you create an Obey file with *Edit*, enter the command:

```
EveryWhere -r %0 -t %1
-c "SetType %%0 %2" -v
```

and save it as %.ChangeType. Note that we have assumed that you have made the necessary changes to *EverySrc* to allow the Root keyword instead of Directory. Please read the Biggest and Best item above for further details.


JIGGLE IT, QUITE A LOT



*HELP

B B+ M C E A A3000

Another bug has come to light in Chris Ruseman's *PicList* application. **Elwyn Morris** has discovered that if a drawfile contains a font that cannot be found, *PicList* locks up! The correction is to simply change the SYS on line 8320 to SYS "XFont_FindFont". The X prevents an immediate error, and allows PROCtext to exit harmlessly. Any text in this unknown font will not be shown.

Until two days ago, we had often wondered what the Look option to *COPY was actually for. The newer option ensures that files are not overwritten by older copies and this, on the face of it, would make the L option redundant. However even if a file is not ultimately copied, because a newer version is already there, it is still brought into memory only to be discarded! Copying from floppy to hard disc, say, can take a very long time even if no files are actually moved. But if the L flag is used as well, *COPY will check the date of any existing files and will only physically move anything if it has to, thus saving time and disc wear.

*QUIT

Once a month we are woken by a sinister knock on the door of our humble abode. Manhandled by the *BAU* goblins, we are incarcerated in the Redwood Dungeon where we are forced to write these sagacious pages. Few realise the horror of converting 32-bit programs to run on Electrons. But you can help. It's not your money we require – indeed, you may well earn a reward from the Redwood coffers. It is code we crave – programs for Beebs and Arcs alike. Large applications, one-line games, hints, tips or even the merest hint of an idea which you think may lighten our burden.

All donations will be given the attention and financial reward they deserve, and the very best will find their way into these distinguished leaves. Ideas are often more worthy of inclusion than their implementations, so fear not if you think your coding may be a little ropey. We have plenty of time in our Dungeon to tidy things up. So as the saying goes – Don't be iffy, put it in a Jiffy! We look forward to hearing from you...

Dave Lawrence, Dave Acton

Send your jiffies to *INFO, *BBC Acorn User*, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. All programs should be on disc and accompanied by a brief description of their purpose and operation.

COMPATIBILITY KEY

- B – BBC B compatible
- B+ – BBC B+ compatible
- M – Master compatible
- C – Master Compact compatible
- E – Electron compatible
- A – Archimedes compatible
- A3000 – BBC A3000 compatible

★INFO COMPATIBILITY TABLE

	BBC B	Master	Electron	Arc
Info 1a (MakeATS)	★	★	★	
Info 1b (Atoms8)	★	★	★	
Info 2a (Coral32)				★
Info 2b (Coral8)	★	★	★	
Info 3a (Biggest32)				★
Info 3b (Biggest8)	★	★	★	
Info 4a (LDPicArm)				★
Info 5a (Wave)				★
Info 6a (Fontboxes)				★
Info 7a (Localtest)				★
Info 8a (Jiggle)	★	★	★	★
Info 8b (EyeStrain!)	★	★	★	★
Info 8c (StringFncC)				★

HAVE A BALL

Here is your chance to learn the art of juggling with a mind-boggling program from

NICK CRAIG-WOOD

Just as musicians have musical notation, jugglers have the Cambridge Jugglers Association (CJA)'s juggling notation. A juggling pattern consists of a sequence of numbers t_1 to t_n. This is, in effect, a program telling a juggler how to juggle the pattern. The juggler has a metronome which ticks at regular intervals, and i counts the number of ticks so far. Here's how it works:

- At every tick, throw and catch a ball
- Throw from alternate hands
- When you come to throw a ball from a hand look at where you have got to in the pattern. For example, take t_i, you must throw the ball you have in that hand so it stays up in the air for t_i ticks
- If t_i was even then throw the ball to the same hand, otherwise throw it to the opposite hand
- If t_i is 2 then keep the ball in your hand for two ticks
- If you get to the end of the pattern, go back to the beginning. (If i>n then i=i-n)

And that is all there is to it! Take a simple example, the pattern 5 1 (five one, not fifty one). To juggle this you would first throw a five throw with your right hand, then a one throw with your left hand. This brings you to the end of the pattern, so you repeat those two throws again and again. This leads to balls going in a high arc from right to left and in a low arc from left to right. It's the standard clown's juggle, three balls 'round in a circle' or to be technical, a three shower.

Here are some more facts about the juggling notation which, if you are mathematically inclined, you can prove:

- The number of balls in a pattern is the average of the numbers in a pattern. For example the average of 5 and 1 is three hence the three balls in the pattern
- For a pattern to be jugglable the following must hold. Take a pattern $t_1..t_n$ and add 1 to t_1, 2 to t_2 etc. The pattern you are left with should consist of several different numbers.

This condition is equivalent to saying that you must only catch one ball at a time. This doesn't quite catch all possible un-jugglable patterns. If



Illustration by Paul Wearing

the largest t_i is bigger than the length of the pattern then it is necessary to use multiples of the pattern.

Some of the common patterns are:

Cascades: 1, 2, 3, 4, 5, 6, 7, 8, 9

Showers: 3 1, 5 1, 7 1, 9 1

Three ball patterns: 3, 4 2, 4 2 3, 4 4 1, 5 1, 6 0, 6 1 2, 5 0 4, 5 3 1, 4 4 4 0, 5 5 5 0 0, 5 0 5 0 5

Four ball patterns: 4, 5 5 2, 5 5 5 1, 5 3 4 4 4, 5 3 4, 5 3, 6 2, 5 5 5 5 0, 6 6 0, 6 3 3, 7 3 3 3, 7 1

Five ball patterns : 5, 9 1, 6 4, 7 4 7 (and more of increasing difficulty)

The notation cannot represent every possible pattern because it is essentially for a one handed juggler, and would require extending to cover two hands.

However, it covers quite a lot of the patterns people like to juggle. It can't cope with simultaneous throws from the left and right hand, throwing more than one ball at once from one hand (multiplex throws) or catching more than one ball at once.

THE PROGRAM

The program is a super efficient juggler which can juggle any valid pattern. It was originally designed on an Atari ST to help me learn how to do the particularly mind stretching patterns (like 5 3 4). It works exactly like the description of the patterns above, except that it has been refined for realism.

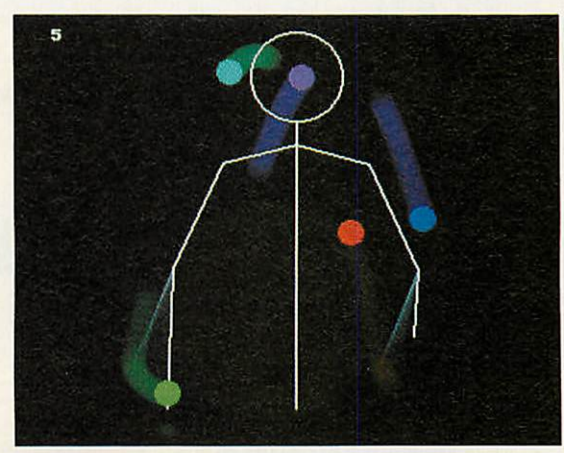
First each ball is held in the hand for one tick of the metronome while being thrown, and the hands go round in small circles. This is roughly how people really juggle. The one throw is a bit different, to make it realistic. In practice, people tend to pass the one throws between the hands, so the program alters the timing to make it look more like this.

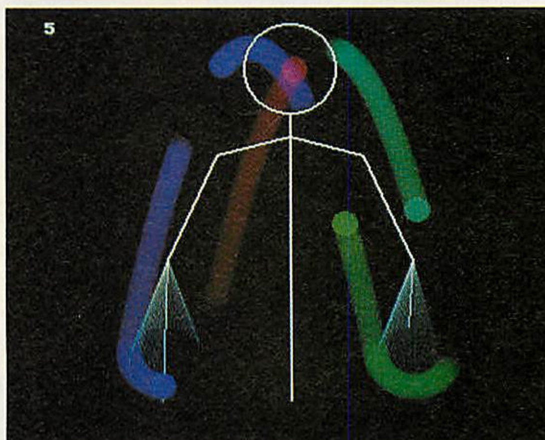
Here is a brief description of how the Arc version works; the BBC version works in a similar way, but is converted to machine code for speed. The program is in three main parts.

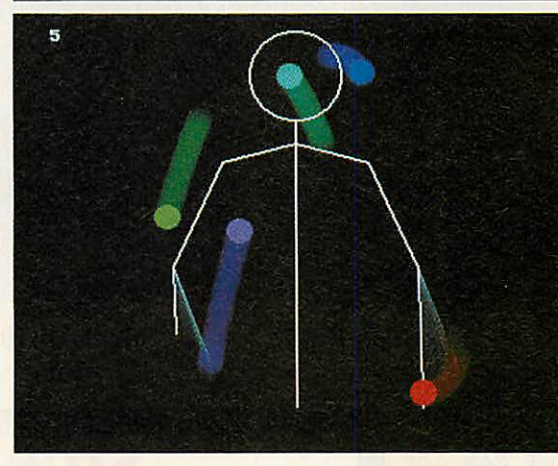
PROCgetpattern gets the pattern from the user, and applies a few checks to it. If the pattern length is odd, this makes it even by doubling it. This is because an odd length pattern swaps sides every pattern repeat which would be no good for storing trajectories.

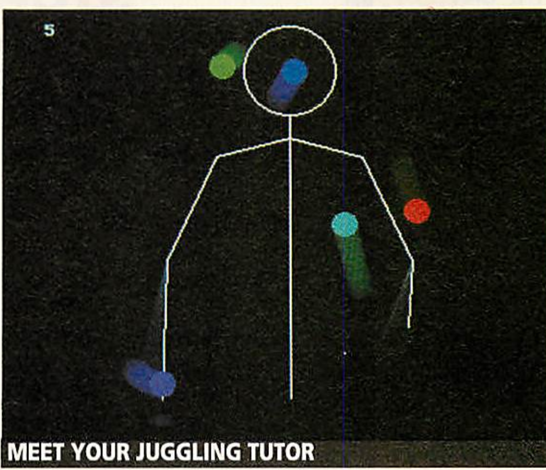
The pattern is then checked to ensure it is for a whole number of balls and that it is jugglable (by the criteria mentioned above). Finally the scaling for the height of the highest throw in the pattern is done.

PROCtrack makes the trajectories for the hands into handx%(),handy%(). This is so that you know where to land the balls and have them carried by the hands. The hands go round in circles at a half a revolution per tick.









MEET YOUR JUGGLING TUTOR

Next the PROC makes the tracks of the balls into trackx%(),tracky%(). If a height h throw is dictated by the pattern, the program makes the ball follow the throwing hand for a half a tick then a parabolic arc for h-1 ticks with height proportional to $(h-1)^2$, and then the catching hand for a half a tick.

When the throw is a two throw the ball never leaves the hand, and when it is a one throw it goes straight to the other hand, with a parabolic arc for one tick. Purists may disagree with this modification; it makes 3 1 look a little odd, but that is how people learn to juggle it!

PROCjuggle uses PROCtickjuggle which juggles the balls for a whole tick. This uses a straightforward double buffered screen to do the animation. The only tricky part in this is starting the pattern off. The balls appear by magic in the juggler's hand when they are ready for the off.

HOW TO JUGGLE

Half the battle in learning to juggle is having a coach. So now that you have a perfect juggler to imitate, here follows a short course in how to juggle three to five balls. First find somewhere to practise, and something to practise with. Tennis balls are less than ideal as they are too light, and a bit too big for smaller hands. Rubber balls – but not the solid rubber type – are quite good but they do tend to bounce all over the place. Probably the best thing to juggle with is a set of beanbags. It is easy to make some cubical ones filled with rice or sand, or you can buy some juggling bean bags at any reputable juggling shop. Over your bed is a good place to practise, or in the garden, but preferably not too near anything breakable.

When you are learning a new pattern count the catches you make to get some idea of how well you are doing. The CJA says that you can 'do' a pattern if you can make 100 catches. However the IJA measures it differently, as two rotations of the pattern (ie, 14 catches for seven balls).

Always learn each pattern with both hands. For instance when you learn how to juggle two balls in one hand, if you are right-handed make sure you learn to do it competently with your left hand as well.

If you get stuck in a groove alter



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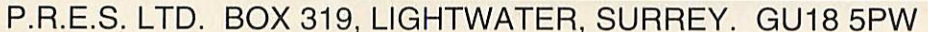
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your pattern. Start with your other hand, or pitch your throws higher or lower. If this doesn't work practise something else. Everyone gets stuck at some time when learning to juggle a new pattern. It is to do with the way the hind-brain learns new patterns, so expect it and try not to wear the groove too deep, otherwise you will have learnt a bad habit. A typical groove is stopping after four catches of three balls. It's just psychological, so carry on juggling!

If your pattern is going wrong, but you can still keep on juggling, then juggle. You will learn more by trying to keep juggling when it is going wrong, than by catching the balls and starting again. While learning to juggle three balls make sure you end by dropping all, or at least two, of the balls and not by catching all three. That can be learnt at a later stage, and will prove too difficult at this point.

To juggle three balls, learn the following patterns in roughly this order:

3 0 0: This is tossing one ball from hand to hand. It is quite important, so watch the program carefully. You throw on the inside and catch on the outside, in a distorted figure of eight. Ignore the program waving its hands around in circles; you don't have to do that! Throw the balls at a height you feel comfortable with, usually about head height. Do experiment! If you throw the balls higher you have more time, but less accuracy. It is a matter of compromise. Always watch the top of the arc of the ball, don't watch it landing in your hands.



3 3 0 2: This is the crucial bit in learning three balls. It consists of throwing (say) a ball from your right hand, then a ball from your left hand, catching one in your left hand and catching one in your right hand, in that order. Once you can do it one way round, learn how to do it the other way round (2 3 3 0). You will be doing this 'cross' all the time when you have mastered three balls. Make sure you get the balls to the same height each time. Ignore the program whirling a ball around in its hand! If you want to slow this bit down then add an even number of 2's onto the end of the pattern.

3 3 0: This is the previous pattern done one way round then the other way round. Some people find this more difficult than three balls, but it is worth practising.

3: Just go for it! If you get stuck in a routine try altering your pattern by throwing the first ball with your other hand, or throwing the balls higher or lower. (If you throw too high your pattern will look like 5 2 2). Make sure all the balls go to the same height, and that the slaps of the balls landing in your hands are making an even rhythm. Everyone I have ever taught ends up running across the room after their balls.

This is because (I think) that we have been conditioned to throw balls forward all our lives. You will stop doing this eventually; juggling in front of a wall may help. When you get really good at three balls, practise not looking at them. The pattern will become transparent – this sounds odd, but you will understand what I mean when it happens. At this point the pattern is now entirely being done by your hind-brain, and you can use your fore-brain for anything you like (like speaking or watching TV). If you practise enough you will be able to juggle with your eyes closed. How to juggle four balls: There are lots of different ways to juggle four balls, but here is the easiest. First learn to juggle two balls in one hand (4 0) then learn to juggle two balls in the other hand (0 4). Now learn 4 4 4 0 (four with a hole). Some people find 4 4 1 helpful. Now learn 4 4 0 4, and then finally 4. Some other ways of juggling four are (roughly in order of difficulty) 5 3, 5 5 2, 5 5 5 1, 5 5 5 5 0, 7 1. You can put a 5 3 in 4 wherever you like. This gives rise to 5 3, 5 3 4, 5 3 4 4, 5 3 4 4 4 etc. Learn to juggle 5 3 by putting it in 4. There are many other sequences like that, for example 6 2 in 4, 633 in 4, 7 3 3 3 in 4, 4 2 in 3, 6 4 in 5. Use the program to experiment, and find other patterns to juggle. Juggling five balls is a lot more difficult than juggling four or three. It takes a lot of practise (say six months on average) but if you persevere with a little every day then you will make it in the end. Learn to do these patterns: 5 1, 1 5, 5 5 5 0 0, 5 0 5 0 5, 5 5 2, 5 5 5 1, 5 5 5 5 0, 5. Keep your pattern wide enough. If you ever manage to do more than about 10 catches then you have broken the back of it – keep practising. If you want to juggle more than five, you are on your own. I knew a couple of people at Cambridge who could juggle seven balls and five clubs (not simultaneously!) so don't give up.

You can make up your own patterns, and a program to search them out wouldn't be too difficult to write. Juggling, I have found, is very good at combatting stress, so have a go! One final warning: juggling is addictive!

FURTHER INFORMATION

I only have one book on juggling and that is *Juggling with Finesse* by Kit Summers published by Finesse Press. ISBN 0-938981-00-5. It's full of wonderful photos, but the tricks are quite difficult to understand.

However, if you want to know anything about juggling, or buy loads more equipment, books etc, then I suggest you get a catalogue from: The Juggling Shop, 56 Islington Park St, London N1 1PX (071-354-5660).

DOING IT WITH DTP

GRAHAM BELL explains how you can get the best from your DTP system

Changing from a conventional publishing system – all scissors, paste and yards of galleys – to desktop publishing is a giant leap for a large magazine. Our decision to do it on the Archimedes made it a leap in the dark. But as the editorial team described last month, it has been a great success: the Arc is now a proven professional publishing platform. So how was it done? The problems boil down to two areas – consistency and compatibility.

COMPATIBILITY

For many desktop publishers in schools, colleges or at home, the compatibility problems of desktop publishing are this – 'How can I turn my *Impression* files into the bromide or film required by the printer?'

For quality results, laser printer output just isn't good enough. And you might want a page bigger than A4, which you can't print on your printer. *BBC Acorn User* uses Computer Concepts' Laserdirect printers for proofing in-house, but requires larger-than-A4 bromide and film to be made for the final printing stage.

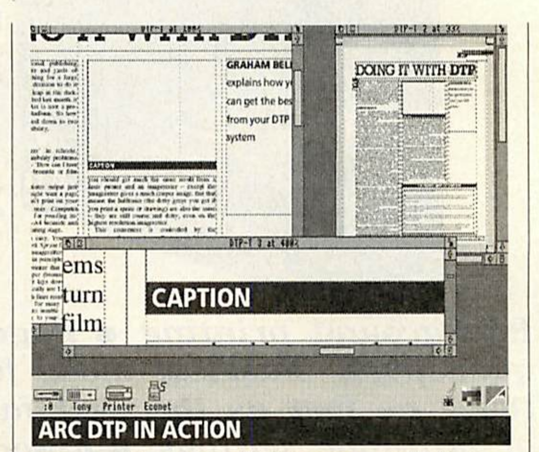
In the Macintosh world, it's easy. You send your Aldus *Pagemaker* or *Quark Xpress* files to an imagesetting bureau. An imagesetter, with its attendant Postscript RIP, is, in principle, little more than a precision laser printer that prints directly onto photographic paper (bromide) or film. But where a laser printer lays down 300 dots per inch, imagesetters typically use 1200 or 2400 dots per inch, giving much finer results.

This simple scheme is fine for many documents, but it can lead you into trouble if, for example, you add extra fonts to your Archimedes, you want to use paper bigger than A4 or you use any graphics in your documents.

The Postscript printing works by associating each of your Archimedes outline fonts with a similar Postscript font, so Homerton is linked to Helvetica, Trinity to Times and so on. These linked fonts must be compatible – the letters must be the same and must have the same width. Many Archimedes fonts are compatible, but some of the more decorative examples are not. Acorn, Beebug, Computer Concepts and Electronic Font Foundry provide a range of compatible fonts. Each new font requires two alterations in the file PSprolog which is inside the *PrinterPS* application directory, and new fonts come either with a new PSprolog file or instructions for changing your original.

Computer Concepts' *Expression PS* can help out with this – it automatically associates your Archimedes fonts with their Postscript equivalents, saving you the trouble of altering PSprolog. But none of this is any help if the bureau doesn't own the Postscript equivalent for the Arc font you want. So check that the bureau has every font you want – it could cost an extra £150 to £200 to buy a Postscript font.

Graphics are a separate problem. Postscript is a 'resolution-independent' graphics language, so



ARC DTP IN ACTION

you should get much the same result from a laser printer and an imagesetter – except the imagesetter gives a much crisper image. But that means the halftones – the dotty greys you get if you print a sprite or drawing – are also the same, still coarse and dotty, even on the highest resolution imagesetter.

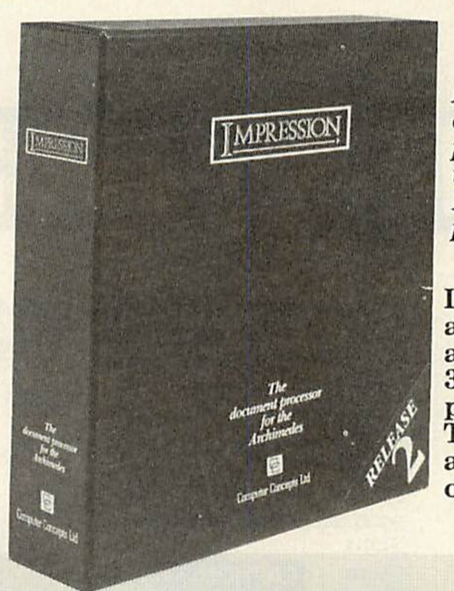
This coarseness is controlled by the screening frequency, usually measured in lines per inch. *PrinterPS* sets this to 60, giving the familiar coarse dotted patterns. If you're using an imagesetter for your output, you can change this frequency to 125, 133 or even 150 lines per inch, which will give much better results on drawings, scans and even grey type. Again, *Expression PS* is the most convenient way of setting the screening frequency.

The finest frequency you can use depends on the printing press and paper you intend to use, so take advice from your printer. *Expression PS* also allows you to set the paper to anything up to tabloid size – though again check with your bureau the maximum width of its output, as many can't print anything wider than 300mm – and that's not quite enough for A3 output with crop marks).

DTP FILE TRANSFER MADE SIMPLE

- Load Impression and your document.
- Load PrinterPS, the Postscript printer driver, and use the menu to set it to print to a file rather than the parallel or serial port. The file name could be something like 'adfs::4.$.page6/ps'.
- Print the Impression document. This creates a file called 'page6/ps' on your disc. The file contains the Postscript commands for printing the page – you can look at them by loading the file into Edit.
- Use Minerva's PC Access or PC Dir from Norwich Careware to transfer the file to a PC-format 720K floppy disc. PC Access has the advantage that you can format these 720K PC discs on your Arc.
- Take the 720K PC disc to your bureau. Apple Macintoshes can read PC discs using applications like Apple File Exchange or Dayna Dos Mounter, and the file can be downloaded to the imagesetter using Font Downloader or its equivalent.

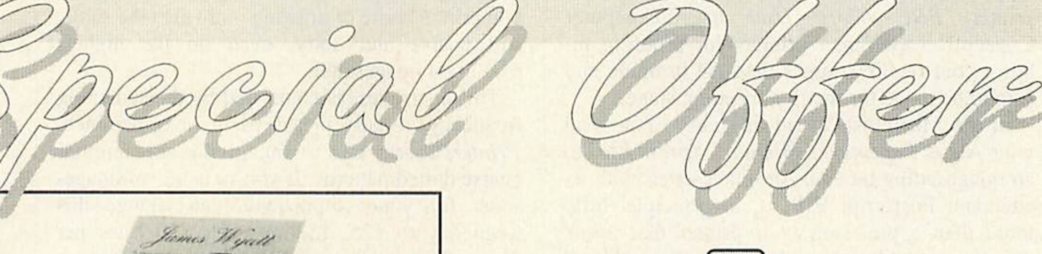
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FIRST SCREENING

JOHN ROBINSON broadens your mind with this clever program for your monitor and Beeb

How often have you wished that you could use more than the normal 72 characters you get in *View*? Wouldn't it be nice to see a bit more of that spreadsheet you're working on? Well, here's a simple solution. Normally the widest screen provided by the BBC is 80 characters wide. With this program, you can increase this to as wide as your monitor will display. You will, however, lose a few lines of the display. This is because the maximum screen length that the hardware will work with is 20K. Type in the source code on the yellow pages, and save it out of the way somewhere. Now run it. It will save a file called Wide102.

Type *Wide102 to get the routine going. If you find that 102 characters is too wide or too narrow, delete Wide102, press BREAK, change the number in line 180, and run the program again. Repeat this process until you find a width which suits your monitor. Don't run the routine twice – the machine will hang until you press BREAK if you do.

Run the program again to save onto your utility disc, or into your library. The program works out the maximum number of lines possible for that width. The most efficient widths (ie, those which waste the least memory) are 94, 98, 102, 106, 111 and 117 characters. The routine will also provide a wider version of mode 4 – half the width of mode 0.

The routine works by trapping the operating system VDU control routine OSWRCH, and setting up the extra-wide screen mode when you select mode 0 or mode 4. It starts at .init_start by checking that the user hasn't added any parameters to the command, because the command doesn't need any parameters, and if it didn't display an error, that would imply that it had accepted the parameters.

At .no_bad_syntax the routine saves the contents of the OSWRCH vector and puts in its own entry address. This means the routine is called every time OSWRCH is called, and it can use the original OSWRCH when necessary. Then it selects the new mode 0. When OSWRCH is called the routine is entered at .newwrch. It checks at .checknewmode to see if a VDU 22 has been issued – the VDU command for MODE.

If one has been issued, it sets a flag to change mode the next time a VDU command is issued – the next command will be the mode number. If it wasn't a VDU 22 command, it just passes the command on to the OS at the original contents of the WRCH vector.

When a VDU 22 is issued, the routine takes the next VDU command to be the mode number. At line 1160 of the source, the routine executes the command as normal, then checks to see if a new mode is required. If it wasn't a new mode that was selected, the routine goes back to the OS as usual. The most important part of the whole program is the part which actually sets up the new modes. This bit starts at .setUpXtraWide. Obviously it is necessary to manipulate the video hardware. All the manipulation is done using the 6845 CRTC chip, by changing the contents of its registers. The table below shows how each register should be changed to give the new mode 0 display.

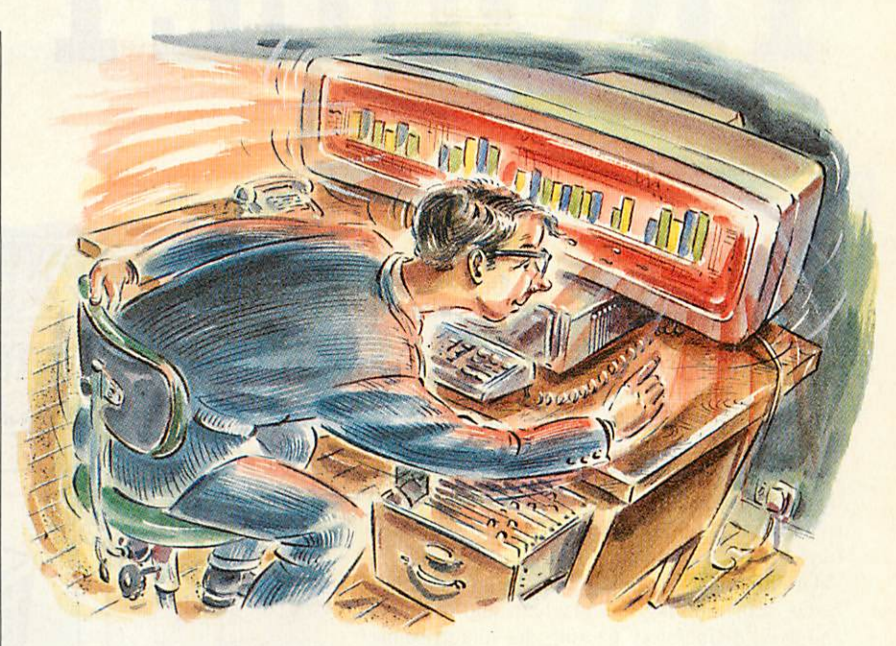


Illustration by Gary Wing

This routine has been tested and found to work with *View*, *Viewsheet* and the Basic Editor. The routine hasn't been tested with the *Inter* series because it has its own wide display modes. It doesn't work on a Master at all, however, because of the absence of the pointer at &E0.

Well, I hope you find the program as useful as I frequently do.

THE 6845 CRTC REGISTERS

Number	Description	Mode 0	Wide mode 0	Comment
0	Total width	127	unchanged	The monitor is the same width
1	Displayed width	80	new width	Want to display full width
2	Horiz sync position	98	57+new width/2	To centre display on monitor
3	Sync width	&28	unchanged	The monitor is the same width
4	Total height	38	34	It complains if you don't do this
5	Vertical sync adjust	*TVx	0 (done with *TV)	
6	Displayed height	32	&A00/newwidth	Fewer lines now
7	Vertical sync posn.	34	&500/new width+18	To centre display on monitor
8	Interlace and delay	*TVn,x	0(done with *TV)	Without interlace only
9	Scan lines per char	7	8(adds a space)	Works better, and more pleasantly
10	Cursor start	8	unchanged	
11	Cursor end	8	unchanged	All the other registers are left
12,13	Memory pointer	changes	same	Up to the OS to set and change as
14,15	Cursor pointer	changes	same	it thinks fit, from the data in page 3
16,17	Light pen pointer	changes	same	

OFF YOUR TROLLEY

Buy some time with **DAVE LAWRENCE**'s fuss-free shopping list program

A number of months ago I was wandering around Sainsburys, idly threatening little old ladies with my appalling trolley control, trying to remember whether or not we needed mixed beans. Yet again I had left that all-important shopping list, written on the back of an envelope, on the kitchen table.

When I got home and consulted the list, sure enough I had written down mixed beans. However on careful inspection of the bottom cupboard not only did I unearth two emergency tins, but I also discovered that we were out of spaghetti and that once again we'd forgotten to buy chopped tomatoes.

On my next shopping trip I fared slightly better, remembering the spaghetti and tomatoes and even deliberately passing the mixed beans. Then, while standing in the checkout queue thinking how much more interesting the shopping of the person in front looked, I had an idea – to build-up a specialised database to keep track of what I buy and when I buy it. It would then be able to carry out a bit of detective work on the data, and produce a shopping list based on how long it usually takes me to eat my way through each item. I got a bit carried away and almost wrote to Mr Sainsbury to ask if he could supply till receipts on 800K ADFS discs. A more realistic proposal would be to scan in the paper receipt and perform a little OCR.

Having determined what was needed I set about writing the program. The finished listing, *Trolley,* can be found on the yellow pages. The program works in mode 7 so it will not work on an Electron. It is, however, Basic 5 compatible and will work on an Archimedes or A3000, albeit in emulated mode 7. A Risc OS version is in the pipeline and should appear in *BAU* soon.



Illustration by Angela Wood

USING THE PROGRAM

The program first needs to find out the day's date. Masters and Arcs will read this from the real time clock using the TIME$ pseudo variable. On other machines it attempts to find the date in a file called Date. If this is not present it will assume a default of January 1 1991. In either case you will be invited to enter the correct date using the left and right cursor keys. Pressing SHIFT will speed up the date movement, and RETURN will enter the date and save it in the Date file ready for use the next time.

The program's menu will then appear. The purpose of the menu options should be self explanatory. In addition to the keys shown you can use ESCAPE to enter Edit mode. As you have not yet entered any data you will not be able to save a file or produce a list, so you'll have to choose Edit list and type some in. you'll only be able to do this if you've just been shopping and have a list of the things you've bought.

ENTERING DATA

Edit mode consists of a scrollable list of all the items you have bought, arranged with the most frequently bought objects at the top. The first 10 are labelled F0 to F9 for quick access, and the last one is marked =>, being the place where you type in new items. The list is scrolled with the

up and down cursor keys. In addition, CTRL-UP will take you to the top of the list and CTRL-DOWN to the bottom, where you enter any new items. To enter a new item simply type in its name and press RETURN. This will create a new => slot below and move the cursor there. To alter the name of an existing item, highlight it with the cursor and press RETURN. To exit from Edit mode press RETURN again.

Typing in names does just that. It will not register a purchase. To tell the program you have actually bought something, highlight the item with the cursor and press a number between one and nine, depending on the quantity you bought. Numbers higher than nine and less than 254 can be entered using the + and – keys. If you mistakenly enter a quantity for an item you didn't buy, press DELETE to remove the number. Once you have told the computer all the things you have bought, press ESCAPE to leave the list editor and save your file. As you will have typed your data in from scratch a default filename will be given. This can be removed by pressing CTRL-U and a sensible name inserted – I call my list DL's. Before the file is saved the data is sorted. As this can take a while, it tells you what it is doing at the bottom of the screen.

I'm afraid that that's all you can do for now. To produce a shopping list the program needs at least two sets of data, so you'll just have to go shopping again and enter some more data before reading on!

PRODUCING A LIST

If you've been using *Trolley* for a couple of weeks, religiously telling it all the things you have bought, you will now be able to use the Produce list option. This will first prompt you for a file name to save the list under. However a default name, based on the day's date, is provided in case you can't be bothered to think of one yourself.

At this stage there are a number of special options – if you give it either an empty string or VDU: the list will be displayed on the screen. Alternatively, PRINTER: can be used to provide a hard copy. In any case the date and name of the list file eg, DL's, will be output along with a list of items the program thinks you might need. I'll explain how this works below. You can now use this as a basis for your actual shopping list.

When you get back from the shops, run the program again and enter all the things that you bought. There is however one unwritten rule about producing lists and that is that you must give the program information about all the things it suggested you should get, even if you didn't actually purchase them all. For example, if you still had some of that item left in stock and didn't buy any more you should enter X instead of a quantity for that particular item. The only exception to this is if you meant to buy an item but couldn't because they'd sold out or you just forgot. In this case don't enter any quantity into the list editor. The program will remind you to get some next time!

And that's all there is to it – just remember to use the program to produce a list each time you shop and ensure you enter all the things you bought when you return. If you do use the program a lot, you may like to change the default name supplied to the file load option. This is the list$ variable in line 60.

HOW IT WORKS

The data is stored as Ascii characters in the file. Each item is named and has a counter for the total number of times it has been bought. There is an additional list of dates and quantities for the last few times the item has been purchased. The actual number is controlled by the maxslots variable in PROCinit. When a file is loaded this data is converted into a 96 byte record containing the same information but in a machine-readable form. Most of the program is taken up by the editor. The actual list production is handled by PROClist and PROCcalculate at the very end of the program.

PROClist examines each item in your list and if there are two or more date entries for it it calls PROCcalculat; no predictions can be made if you've only bought something once. PROCcalculate does all the dirty work, calculating the period between the first time you bought the item and the most recent. It then adds up the total quantity bought within that period, not including the number bought on your most recent shopping trip. From this it can calculate how long, on average, it takes to consume one item. It multiplies this time by the number of items bought on your last trip to work out, as best it can, how long these will last. This time is added on to the date of your last trip to come up with a date of when it thinks you will probably run out.

A second period is calculated which ignores any trips where you did not buy the item ie, where you entered X in the list. This is divided by the numbr of trips made in that period, to calculate the average duration between purchases for the item. If the run out date falls before today plus half the average period then the program reminds you to replace it. Originally I did not add on this average, but the program then only reminded me when it was too late! Adding the whole average on causes a reminder if you go shopping at any point mid-week. This became annoying if you were just going shopping the next day because you'd forgotten a few things. Adding half the average is therefore a compromise which seems to work reasonably well.

The higher the value of maxslots the longer the program will remind you to buy things even if you don't need them. Eventually all the quantities stored will become zero and the program will forget about that item.

I've not been able to exhaustively test the program, but it does seem to give the expected results. I'd be very interested to hear from anyone who uses the program seriously and also if anyone can verify that the algorithm outlined above is indeed correct!

WISE WORDS

You may think you know how to use a program, but are you using it properly? Software guru PAUL JAMES tells how you, too, can be a power user

You've learnt enough about the Desktop and Risc Os to be able to use any application now at its simplest level, which was the prime aim of our first series, First Steps. But using an application efficiently and to its full potential is another story.

This new series will put an individual application under the microscope and lead you through its more specialised functions, tell you what you can use it for, and perhaps help you how to get round a few problems that the application poses.

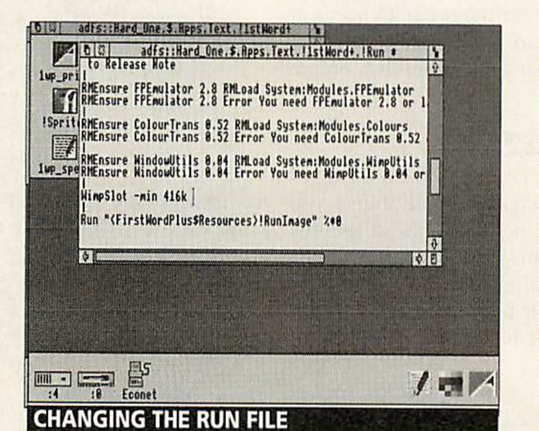
We begin with *1st Word Plus*. This application is best described as a word-processor – indeed that's what it is. Its main aim is to allow you to write letters or documents and print them out.

It is quite memory-hungry and is most at home on a machine with more than 1Mb of memory, as are most applications. However there is a simple bug in earlier versions of the application which means that when you run it all of the available memory is 'eaten'. This can be fixed quite simply by editing the *Run* file inside the application directory.

First of all load *Edit* then place your *1st Word Plus* backup disc in the drive. If you haven't got one then make one. Now hold down SHIFT and double click on the *1st Word Plus* application. A directory viewer will open showing all the files you have available.

Drag the file called !Run onto the *Edit* icon on the icon bar by holding down Select then moving the pointer while still holding the button, and letting go when the pointer is pointing at the *Edit* icon.

The !Run file is obeyed when you double click on the application. It sets up some variables, particularly one that can be used to find out which disc the application is on, tells the computer how much memory the application needs, then runs the actual code that is the application. Newer versions of *1st Word Plus* will have been modified and if your version has then a short note at the top of the !Run file will say so. If not then you will have to modify it yourself.



CHANGING THE RUN FILE

The line that tells the application how much memory it is allowed to claim is the one that begins Wimpslot -min. You will have to scroll the *Edit* window down to find it. If this line just reads WimpSlot -min 416k then this allows the application to take all the memory it can. Adding a -max 608k after the -min 416k tells *1st Word Plus* that it isn't allowed to take more than 608K. Click on the Edit window and using the cursor keys to position the caret after the -min 416k then type the -max line.

Your line should now read WimpSlot -min 416k -max 608k. This clears up many problems experienced by owners of early versions of *1st Word Plus*, and makes it usable if you have only 1Mb of memory, but this is no excuse not to upgrade though.

Now re-save the edited !Run file by moving over the Save option and clicking on OK. Because you loaded it from disc *Edit* knows where to put the file so you don't need to drag it to a directory viewer. Close the directory viewer and quit *Edit*.

Load *1st Word Plus* and close the directory viewer. This can be done in one fell swoop by double clicking with Adjust on the filer icon for

PRACTICE TEXT

...in the case of this month's disc, this is fine for programs like Trees in the *INFO section, which will run straight away. But for the scrolling routine it is more of a problem.

You need to run the MakeFont program first which will save some data to the disc. As the disc arrives write-protected, this will cause an error – to use many of the programs on the Monthly Disc it is best to transfer them to another disc and run them from there, from Basic, not the desktop, as instructed above.

Listed here are some of the commands that will help you find your way around the monthly disc while in Basic...

the application. Bring up a *1st Word Plus window* by clicking on its icon on the icon bar.

The window is a bit more complicated than an *Edit* window. Most notable is the ruler, which has tab positions and margins marked on it. Now type in the three specimen paragraphs in the first box. Don't worry about mistakes – in fact make a couple of spelling mistakes on purpose. When you reach the end of a paragraph press RETURN twice.

Notice that when the cursor reaches the right margin, denoted by the ']' character on the ruler, the word that you are typing is forced down to the next line. This is one of the main features of a wordprocessor and is the reason *Edit* can't be described as one, (when it reaches the end of a line, the cursor simply moves onto the next one and splits the word). This feature can be turned off, by unticking the Wordwrap option from the Edit submenu, but then you might just as well use *Edit*.

THE TEXT AS YOU TYPE IT IN

Put the cursor on the first line of the second paragraph and choose Add Ruler from the Layout submenu, an Add Ruler dialogue box will pop up. Don't worry about the options here for the moment, just click on OK. Now from the cursor downwards, to the bottom of the text or the next ruler, this new ruler takes effect on the text. You can add as many rulers as you like and moving the cursor across ruler boundaries will adjust the ruler display accordingly.

PARAGRAPH TWO REFORMATTED

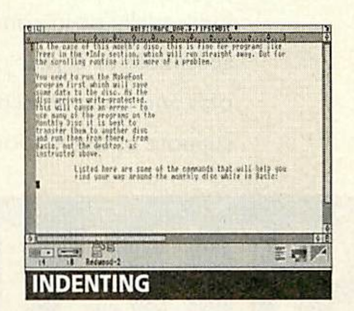
To alter the width of a ruler press and hold Select over the right hand margin character (the]). Drop it about half way along the ruler and let go of Select. This is now the right margin. To reformat your text to this margin place the cursor at the beginning of the paragraph and choose Reformat Paragraph from the Style submenu.

When you reformat text, *1st Word Plus* may try to hyphenate a word, but it will ask you first. You can move the hyphen left or right in the word with the arrow icons to the position where it looks best, then click on OK. If you don't want that word hyphenated then click on cancel. Click on Disable to turn hyphenation off completely, you can also do this from the Edit submenu.

'Soft' hyphens inserted by *1st Word Plus* to break words across lines, those which may well disappear when the text is reformatted are represented by tildes (~) on screen, but in print they come out as ordinary hyphens. This is to distinguish them from hyphens you have inserted yourself in phrases such as 'single-line'.

You can position this margin more accurately by bringing up the Modify Ruler dialogue box. To do this double click on the little fork symbol at the far left of the ruler. Now you can make the ruler length exactly the number of characters you want by typing the value in the Ruler Length box, if you've got time to waste you could even use the arrow characters. Clicking on OK fixes the margin, now position the cursor at the start of the paragraph and choose Reformat Paragraph, or Reformat Whole Document.

Try putting the cursor in the second paragraph and holding down Select over the fork symbol. A line will be shown down the left-hand side of the page, extending from the start of the current ruler to the end of it.


INDENTING

You can also adjust the left margin. Place the cursor at the beginning of the last paragraph and choose Add Ruler again. This time drag the left margin about 10 characters in. Now if you choose Reformat Paragraph the text will be indented.


SELECTING A WORD

Another feature of rulers is whether or not text is 'ragged right' or fully justified between them. Place the cursor at the beginning of the second paragraph and bring up the modify ruler dialogue box by double clicking on the fork symbol. Click the justify button on and click on OK. Now if you reformat the paragraph with F7 (the key shortcut for Reformat Paragraph) then the text will be fully justified, extra spaces are put between words to make up the width of the lines to the width of the ruler.

Tables can be laid out in *1st Word Plus* using the TAB key. Pressing it will insert spaces until the next tab character on the ruler is reached. You can alter the position of these characters by clicking Select on one to delete it, then clicking elsewhere along the ruler to place a new one. A quick way to delete all of the tabs is to pull the right margin across, let go of it, then pull it back.

Double clicking on a tab will turn it into a hash mark (#) which denotes a decimal tab. When you tab across to one of these anything you type will go to the left of the tab, until you press SPACE or FULL STOP or the text reaches any text or tab character before it. Since printers are capable of a great many effects, *1st Word Plus* is able to use these. Adding a style to an area of

SPACED OUT

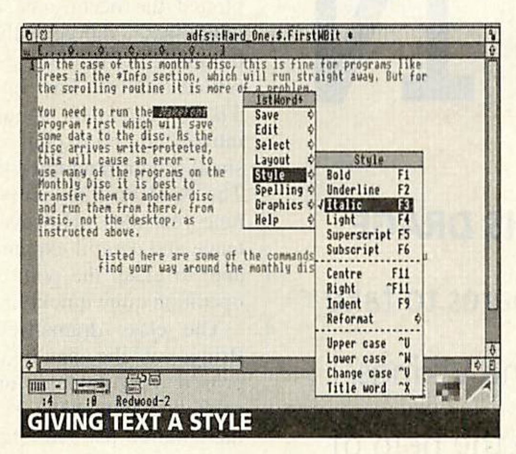
1st Word doesn't use normal spaces – instead it uses a special code for a space. So for the reformatting to work correctly when importing text into 1st word Plus you must first change all of the spaces to this special code. This can be done in Edit by loading the text and choosing Find from the Edit submenu. In the Find box put a space and in the replace box type \x1e, make sure that the magic characters are turned on. Press RETURN then replace until 'End of File', now save your text into 1st Word Plus and choose Reformat Whole Document from the Style menu.

text is as simple as selecting it, then choosing a style from the Style menu.

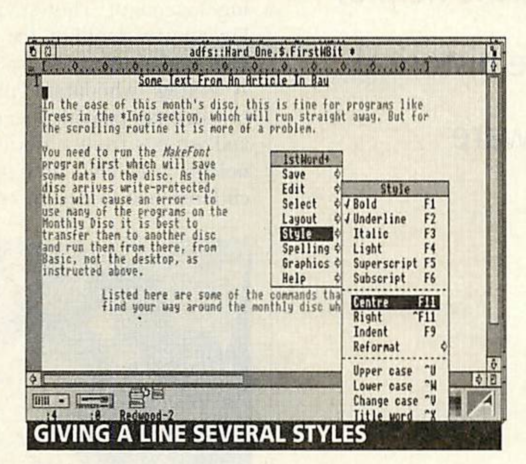
Press and hold Select on the *1* of *1st Word Plus* in your text. Then drag the pointer so the black area covers *1st Word Plus*. Now press Menu and move over the style submenu and click on Italic. The characters will adjust to show the style put on the text.

Press CTRL-UP to move to the top of the text and press Return twice to make two clear lines. Move back up to the top and type, 'some text from an article in bau', all in lower case. Now select this line and with Adjust choose Title Word, from the bottom of the Style submenu. This will capitalise all of the words. Also using Adjust choose Bold and Underline, and finally with Select choose Centre. That's how easy it is to add styles to your text.

A very important feature of a wordprocessor is the ability to know where page breaks occur, and to be able to add them yourself. If you click with Select in the grey margin on the left-hand side of the window you can add a page break. When printed, this page break will make *1st Word Plus* eject the rest of the current sheet of paper it's on and continue printing on the next page. To delete it click Select again.



GIVING TEXT A STYLE



GIVING A LINE SEVERAL STYLES

1st Word Plus will automatically insert page breaks when it reaches the end of a page. These can be distinguished from those you put in because they have a small dotted line instead of a solid one. The page length is set up from the Page Layout dialogue box in the Layout submenu. A4 paper can fit 70 lines down the page, whereas computer fanfold paper fits 64.

Now is a good time to save your file – it's a good idea to do so regularly. Bring up a directory viewer of a blank formatted disc, press Menu over the *1st Word Plus* window and move over the File option in the Save submenu. Press CTRL-U to delete the standard filename and type in your own, something like MyText will do. Now drag the icon onto the directory viewer and the file will be saved. *1st Word Plus* now knows where to put this file and will save it when you click on OK in the future.

There's not much point to doing all this if you're not going to print out your document. *1st Word Plus* works in character mode, which means it uses the standard draft of your printer. Here lies a problem. Different printers have different codes. For instance, a bold code on one printer might mean something completely different on another. For this reason several 'printer drivers' are included on the utilities disc.

Put the utilities disc into the drive and bring up its directory viewer by clicking on the floppy icon. Now open the 1WP_Print folder and then the Config folder. Here are configuration modules for some printers. Your printer is probably Epson compatible so you'll need either the Epson_lq, Epson_lx or Epson_rx module.

To load a printer configuration press menu over the *1st Word Plus* icon on the icon bar and choose Show Keypad. Now drag the printer configuration file onto the printer icon shown here. The device window will change to show you the new printer driver that has been installed. To check this printer driver is the correct one for your printer try printing out the PrintTest file in the 1WP_docs folder on the program disc.

Make sure your printer is loaded and on-line, then simply drag this onto the printer icon in the keypad window. If all of the styles come out OK then this is the right driver for your printer, if none, or only some of the styles work then try another driver. Take a look at page 131 of your *1st Word Plus* manual for a description of which printer each driver is for.

Of course you may have a printer that doesn't feature in this list then you may need to make up your own. But this is a difficult and time-consuming job. In fact somebody has already done it for you. Norwich Computer Services sells a Careware disc full of such drivers.

That's it for the first in the series. Now you know enough about *1st Word Plus* to be able to print out anything from your shopping list to a letter to the bank begging for more money, and if you get it to look good enough then they may well be impressed enough to give it to you!

COMPETITION

What application do you wish to see covered in this series of articles? Simply write this on the back of a postcard, together with what you use the application for most commonly and the first five out of the hat on 31 August 1991 will get a free *BAU* show ticket each. Send your postcards to: Stepping Up, BBC Acorn User, 20-26 Brunswick Place, London, N1 6DJ.


ADDING PAGE BREAKS

EASY PRINTING

To save yourself the bother of having to load your printer's configuration file from the utilities disc every time you load 1st Word Plus, it is possible to have it done automatically from within the application itself.

Set aside a Ram disc of around 32K and drag the printer configuration file into its directory viewer. Now open the 1st Word Plus application directory by holding down SHIFT when double clicking on the icon. Drag the configuration file from the Ram disc to this new directory viewer, delete the file 1wp_print and rename your printer's configuration file to this. Now this is the default printer driver.

SETTLE DOWN

CHRIS DRAGE prepares to take on the Vikings, with the help of some historical software

During the second school term this year, my class of thirty Year 3 children prepared to do battle and tackle the Vikings – from within the relative safety of their classroom! At the time of planning my aim was to attempt History Study unit 2 which, as part of invaders and settlers, suggested the Vikings as a suitable subject for study at the year three level.

The topic also slotted neatly into my 'developing themes' approach this year where I have tried to splice each topic into the last as naturally as possible but within the framework of the National Curriculum. Not unnaturally, most of my topics this year have centred around a science theme (as science is a core curriculum area).

Having just completed Floating and Sinking (and who hasn't!) the children naturally wanted to make and test their own boats as they had completed several problem solving situations involving, for example, making 100g of plasticine float and carry a load. It was not difficult to introduce the Vikings from this angle as these people were excellent boat builders and using polystyrene meat trays, straws and paper, it is possible to make a fair replica of a longship.

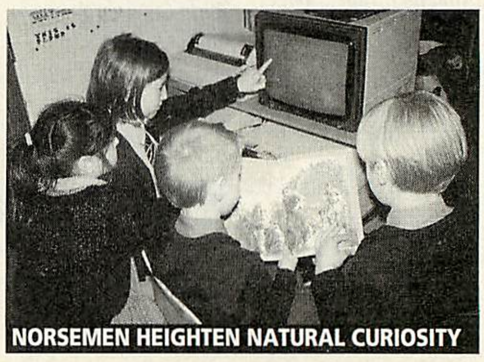
The mere mention of the word 'Vikings' heightened the children's natural curiosity which was good as historical topics are frequently difficult to introduce to young children, being so remote in terms of time and divorced from the childrens' own experiences. The first task, as always, was to develop a suitable topic-web (see illustration) which plots the range of tasks and the development of themes.

The next task was to gather and assemble suitable resources with which to provide the necessary vicarious experiences. Important among the list of resource materials was computer software of both the content-based and content-free variety.

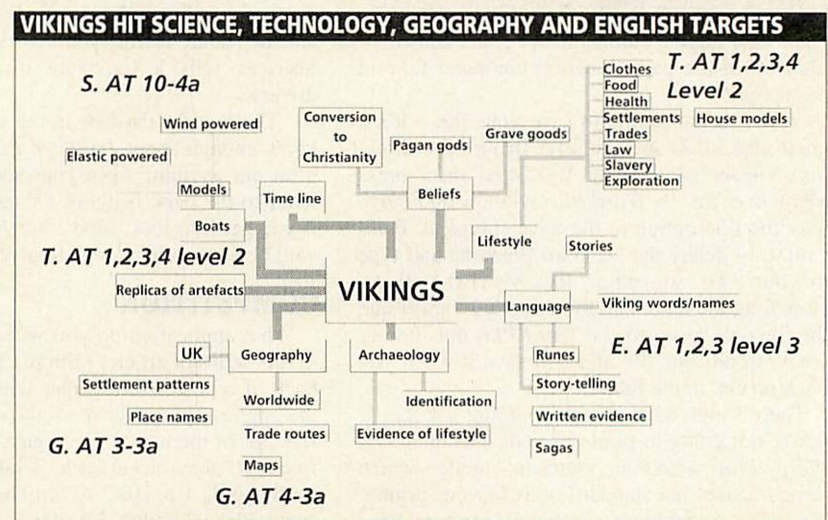
The first part of the study revolved around three major information sources : BBC TV's *ZigZag* programmes, Fernleaf Software's *Vikings Pack* and *Junior Projects No 34* (Scholastic Publications). The former stimulated a number of very interesting activities. As the first phase of any topic concerns information and image gathering, the *ZigZag* broadcasts were invaluable at providing visual imagery and motivating children to seek further knowledge. There is no computer program anywhere (yet), that can substitute that most vital ingredient – direct experience. Unfortunately, these London children lived too far from what is regarded as the foremost Viking site, the Jorvik Centre at York, to permit a visit. However, this experience was substituted by a video of the Jorvik Viking Centre (included in Fernleaf's topic pack).

One of the first tasks was for the children to set about looking for evidence of Viking settlement in Britain by using place names on maps as a guide. On a map of England the children plotted the occurrence of place names ending with -by, -thorpe, -thwaite, etc. Slowly it became evident that the Vikings predominantly settled in North East England. At this point the *Viking England* simulation (Fernleaf) was introduced and explained to the children before small groups attempted the first program entitled The Raiders. This software is really suited to nine-year-olds. However, with teacher assistance and careful explanation, the children were able to grasp the point of the software and its operation quite quickly.

The class dramatised the fall of London Bridge at the hands of Viking raiders.This proved very popular and a large mural was painted depicting this event. In another activity, the children painted large scenes from the Viking legend of Thor's visit to the giants. The legend was retold by the children for the assembled school using their paintings as illustrations. A Viking 'whodunnit' play (part of the *ZigZag* broadcasts), provided an opportunity as to rights and wrongs from a Viking point of view. Technology was also brought into play when the children had to design and create model Viking


NORSEMEN HEIGHTEN NATURAL CURIOSITY

VIKINGS HIT SCIENCE, TECHNOLOGY, GEOGRAPHY AND ENGLISH TARGETS



longships from simple materials. The resulting models were each tested in a tank of water and given a timed run using a hair drier as a wind source. The results of the tests were described and recorded on charts and the reasons for success and failure discussed.

Here another item of software was brought into play. *Display Data* (Resource), enabled children to enter data into the computer and have it printed out in the form of a barchart or piechart. Software of this nature really enables children to grasp the significance of the computer as a tool in the classroom.

The latter part of this study involved the children working in groups of five or six on a variety of activities ranging from researching information from books, viewing slides to listening to a taped story and completing a sequencing exercise. Two of these group activities involved the classroom computers. I had created a short piece of text about the Vikings with the now familiar *Developing Tray* cloze procedure program.

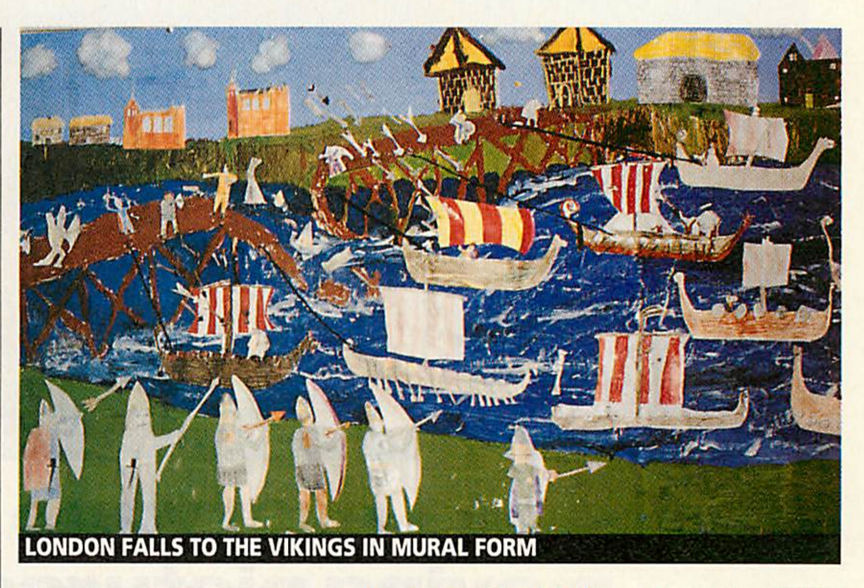
The software requires the children to reconstruct the text from a series of dashes and less common letters. The program stimulates an amazing amount of discussion over strategies and the validity of predictions. A scratchpad can be used to check whether suggestions make sense, to test predictions and make notes. Although inter-group competition was actively discouraged, it soon became apparent that this activity was one of the most popular of those offered as groups vied to outdo each other on points.

Undoubtedly the most popular activity was the simulation offered by the *Viking England* suite. The children, now familiar with The Raiders were keen to continue with the second part of the suite – Journey's End. In this the children take on the leadership of a Viking party intent on settling in England. Decisions regarding the choice of site, the order in which various tasks, like setting up camp, must be completed, are integral to this part of the suite.

A valuable aspect of this software lies in the fact that children must choose other tasks they consider important apart from those offered by the program. The subsequent discussion revealed a great deal about the children's comprehension of the Vikings. The arrival of another party of Vikings who settle away from the children's `group' provides opportunities for empathy mellowing the somewhat materialistic attitudes present in The Raiders. The children had to decide whether or not to co-exist peacefully with these strangers.

As a record of their work the children completed maps depicting the siting of their settlement. The teacher has access to a record of each group's decisions via a special teacher's page. The third and fourth parts of the suite, The Move and The Jarl, I judged to be too difficult for this Year 3 class.

When the classroom computers were not engaged in *Developing Tray* and *Viking England*, they were seldom idle as children used them continuously for wordprocessing and printing text, headings, captions and subtitles for their project books. *Pendown* and *Signwriter* (*Pendown Toolbox*) both from Logotron, are the standard tools in this class. The children really appreciate the various fonts and sizes the software produces on the printer. These are then cut out, coloured in and mounted.


LONDON FALLS TO THE VIKINGS IN MURAL FORM

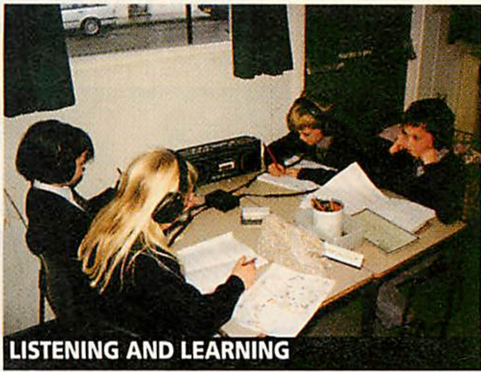
PRODUCT DETAILS

Viking England and the Vikings Resource Pack are available at £35.95 and £55.95 from Fernleaf Educational Software, Fernleaf House, 31 Old Road West, Gravesend, Kent DA11 0LH Tel: (0474) 359037, for the BBC B, B+, Master 128, Compact.

Display Data is available at £10.95 from Resource, Exeter Road, off Coventry Grove, Doncaster DN2 4PY. Tel: (0302) 340331, for the BBC B, B+, Master 128.

Pendown and Pendown Toolbox are available at £39 and £18 from Logotron, Dales Brewery, Gwydir Street, Cambridge, CB1 2LJ Tel: (0223) 323656, for the BBC B, B+, Master 128, Compact.(Archimedes Pendown also available).

Developing Tray is available free of charge from your local authority computing centre.


LISTENING AND LEARNING

To say that the children gained a great deal from this historical study is to understate the case. Many voted it the best topic they had completed this year while others were so enthusiastic as to persuade their parents to take them to York during the half term just to visit the Yorvik Centre. Through a wide range of vicarious experiences facilitated by a wide range of resources, the children became appreciative of many aspects relating to the Vikings and their way of life which the popular stereotype completely overlooks. Similarly, the knowledge and empathy gained from such an in-depth study highlights one of the major weaknesses of the National History curriculum which does not provide the time nor opportunity for such a study at this level.

The computer, even the humble and aged, eight-bit BBC B utilising a variety of software tools, can play a valuable part in presenting the topic to the children and bringing to the learning situation an aspect which is fresh and highly motivating. Ageing though it is, *The Vikings Suite* was a complete success but due to the age of the children a good deal of teacher-support was required. *Developing Tray* also provided the children with a fascinating psycho-linguistic exercise. Other software tools helped children improve or extend their project work. In this topic the classroom computer had a very high profile in the range of activities presented to children.



CUNNING CRUNCHING

PAUL JAMES continues with his collection of Beeb-stretching routines and shows you how to do the Crunch!

Computer graphics is an area in which most people dabble at one time or another. This month I have devoted Pieces of Eight to a couple of interesting graphical routines that will allow you to squish, squash and stretch your screens until they feel positively sick!

Of the most popular routines *BAU* ever published, the screen compression programs LDPIC and SVPIC certainly feature near the top of the list. They were originally developed to squeeze lots of pictures onto the *Acorn User* gallery disc, a few of which are splattered about these pages. The disc had on it 25 screens (coming to 500k) and a few more utilities. All this, unsquashed, added up to 600K worth of data. Since the *BAU* 5.25in discs can only store 200K of data then you can immediately see the benefits of such compression routines!

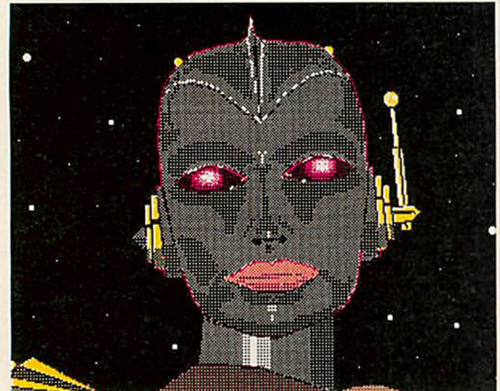
When people saw this routine in action the source code was called for, and it was published in the October 1986 issue. The programs to generate the LDPIC and SVPIC code (pronounced 'ludpic' and 'suvpic' believe it or not) are the first two Pieces of Eight listings on the yellow pages this month.

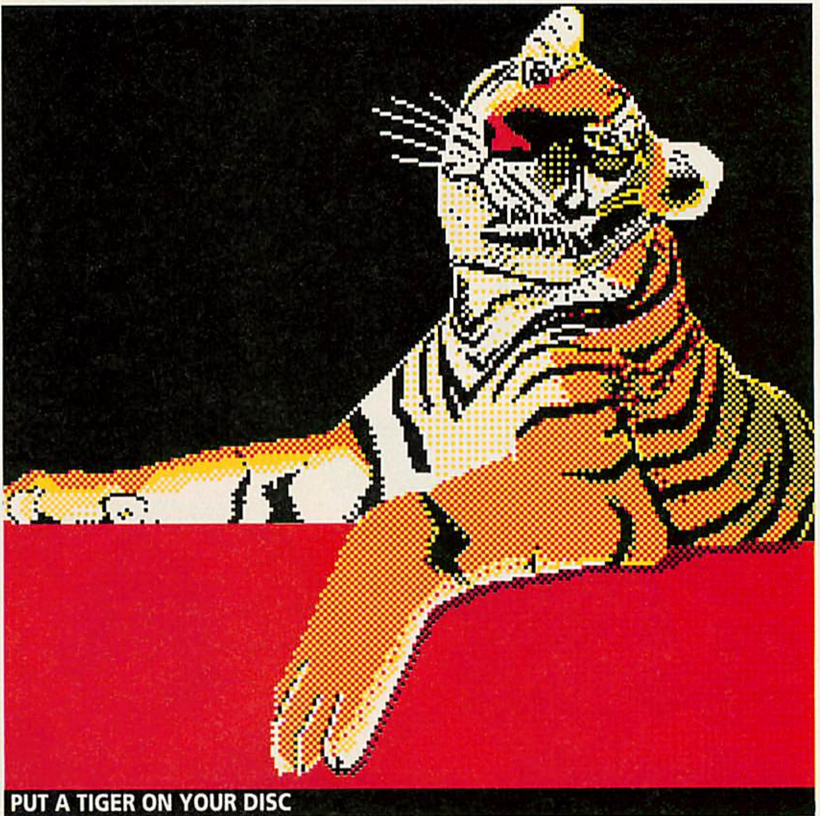
Screen memory on the Beeb is just the same as normal memory – you can even run Basic programs in it – as long as nothing is printed over the top of them, or the screen isn't cleared. The difference is that the video register reads the memory addresses and turns the numbers into a signal suitable to drive a monitor.

To save a screen in mode 5 you would type *SAVE Screen 5800 8000. The parameters 5800 and 8000 are hexadecimal addresses. &5800 is the start and &8000 the end of the screen memory, which is where the video chip finds its data. The ampersands denote that the number is in hexadecimal. Different modes use up different amounts of memory.

For instance the higher resolution Mode 1 takes up the area in memory from &3000 to

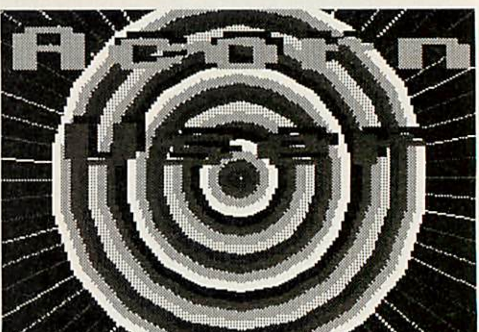


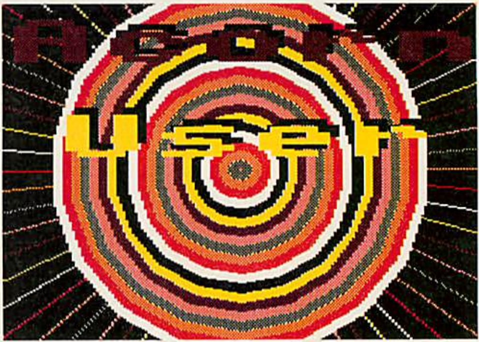


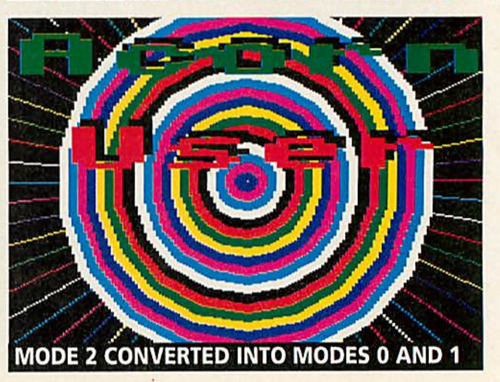


PUT A TIGER ON YOUR DISC







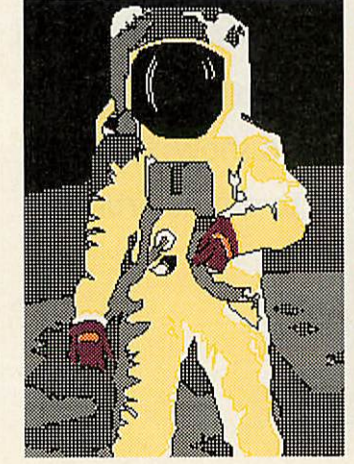


MODE 2 CONVERTED INTO MODES 0 AND 1

&8000. This is 20K of Ram. Type in listing 1 and save it as SVPIC-S. When you run it (go ahead, try it now) the program will create a machine code file called SVPIC, if you have typed it right. If it isn't, then you will be told.

The second listing when entered and run (first save it as LDPIC-S though) will save a file called LDPIC. If you have ADFS then put these two files in your library. DFS users should leave them on a utility disc or graphics disc. Then typing *SVPIC Picname will save a compressed screen (it may take a while) and *LDPIC Picname will decompress it. As a comparison, I 'Svpiced' a screen from 20,480 bytes down to just 6,310 bytes, about 30 percent of its original size.

Run length encoding is used to compress the screens. This detects sequences of bytes of the



same value and replaces them with two bytes, the first one being the value, the second one the number of times it occurs.

This routine is very good at compressing screens with large areas of the same colour, but for a screen that has lots of dithering effects this routine is not as efficient as it could be. SVPIC gets round this using a rather cunning stunt. It actually tries to compress the screen several times, each time increasing the step it takes to get the next byte. It then uses the step which was most efficient. For example if a lot of the screen is dithered, every other byte being the same, then a step of two will increase the efficiency of the routine greatly. This is the reason why some SVPICed screens may load differently.

Finally here is a short routine that will load a named screen, and then compress it, without overwriting it with text or the cursor.

```
10 MODE 7
20 *CAT
30 INPUT "Name of screen to
compress : "s$
40 INPUT "Mode screen is in :
"mode%
50 MODE mode%
60 VDU 23;8202;0;0;0;
70 OSCLI "Load "+s$
80 *SVPIC Crunched
90 MODE 7
100 PRINT "Saved as 'Crunched'"
110 END
```

Type this in and save it as Compress. Running it will ask you for the screen to load and which screen mode it is in. If the screen has any palette changes (meaning VDU 19) then put these in after the line to turn the cursor off (line 60). SVPIC will save these, and when the screen is LDPICed the routine will read the colour translations and ensure that the screen is displayed correctly.

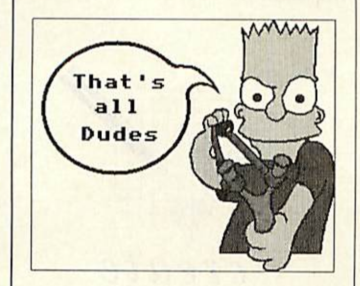
Mode to mode

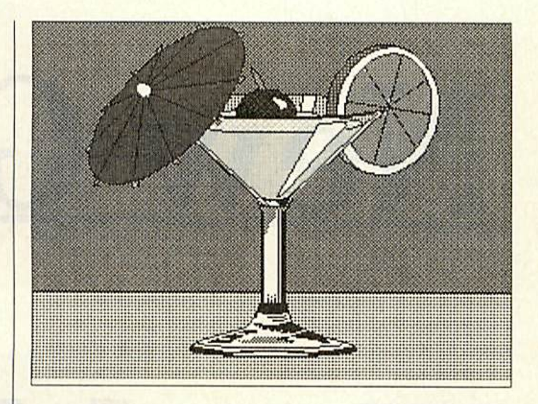
The second utility this month is a routine that will convert screensaves from one mode to another. **Phil Wilks** found that many art packages used modes 0, 1 or 2, but were unable to load a mode 2 screensave into a mode 0 screen. Trying this will just give you a mess, because each mode uses a different layout.

Phil's program overcomes this and allows you to convert a mode 1 or 2 screen to mode 0 or a mode 2 screen into mode 1, at the gain of extra resolution, but with less colours.

A typical use for this routine would be to transport a screen created in one art package to another one that uses a different mode. Phil suggests you could also use it to see how your colourful mode 2 screen will come out on your black and white printer, by converting it to mode 0, which has two colours. This can be done quickly, in less than a second actually, and you save paper at the same time.

There is one listing to type in. Listing 3 will create the necessary tables for the conversions and the actual machine code routines which are then saved as O.Modecon. When running this set page to &1900. Much of the code replicates itself, so you could save yourself a lot of time by deft use of the copy keys.





New colours for old

In modes 0, 1 and 2 screen memory runs from &3000 to &8000, and screens can be loaded into each of the modes. The difference is in how each byte is decoded to represent a colour on the monitor. In mode 2 the byte is able to represent two pixels, each of which has 16 different possible states, therefore 16 colours can be used. In mode 0, on the other hand, each bit represents one pixel, representing one of two states, either black or white, on your monitor.

Any one byte can hold a maximum of 256 different values (0 to 255). Phil simply worked out a table in which each value corresponds to a value in mode 0, 1 or 2 which will look correct on screen.

In the listing the tables are created, then the machine code routines which use them are assembled. The routine uses black-and-white dot patterns to approximate to screen colours. Converting a mode 1 or 2 screen into mode 0 means loading it into mode 0, then calling the appropriate machine code routine.

As an example, here is a listing to take a named mode 2 screen and translate it into a mode 0 screen.

```
10 *Load Convert
20 mode1to0%=&1500
30 mode2to0%=&1524
40 mode2to1%=&154C
50 MODE 0
60 VDU 23;8202;0;0;0;
70 *LOAD Screen
80 CALL mode2to0%
90 *Save Newscr 3000 8000
100 END
```

The three code entry points are mode1to0%, mode2to0% and mode2to1% respectively. For instance, to convert a mode 2 screen to mode 1 then change line 40 to MODE 1 and line 70 to CALL mode2to1%.

Competition

If you think you can do better than the screens featured here, and we're sure you'll agree that's quite a challenge, then send in your eight-bit masterpieces on disc.

Superior Software will let the five that we judge the best choose a game from its extensive range. So get drawing.

Send in your screens on a disc (any format) with your name and address written on the label. The closing date for entries is the end of September 1991.

The New Generation of Word Processors

Word processing is evolving from the traditional character based word processors of the past to the new graphical based word processors. Even on PCs this evolution is evident with the release of new graphic based word processing products that run under Windows 3 from the largest software houses Microsoft, Wordstar and Lotus.

The new generation of word processors all have certain features in common. They all allow free use of different text sizes and styles. They all offer a range of graphic manipulating tools and, of course, they all operate under a windowing environment.

While most PC users are only just coming to grips with the new style of word processing, Archimedes owners have been able to word process like this for 18 months, since the introduction of Impression.

Archimedes owners had the use of features like a good WIMP environment and outline fonts long before the PC world caught on. And today the machine still offers features such as inter-application data transfer and font anti-aliasing that no other mainstream system can provide, ensuring that the Archimedes architecture will continue to lead the way. Quite simply you get tomorrow's PC architecture today on the Archimedes.

This image (an old engraving of Charles Dickens) was captured using Scan-Light Junior at 400 dpi. This scanner is ideal for black and white line-art or pictures such as this.

With the release of the new greyscale scanner, Computer Concepts can now supply all the components for Archimedes owners to put together the ultimate word processing system. Our hardware and software products support all three stages of document production, from capturing pictures, through word processing and document creation to printing.



capture



create

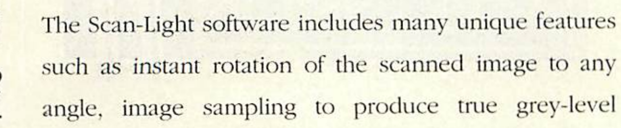


print

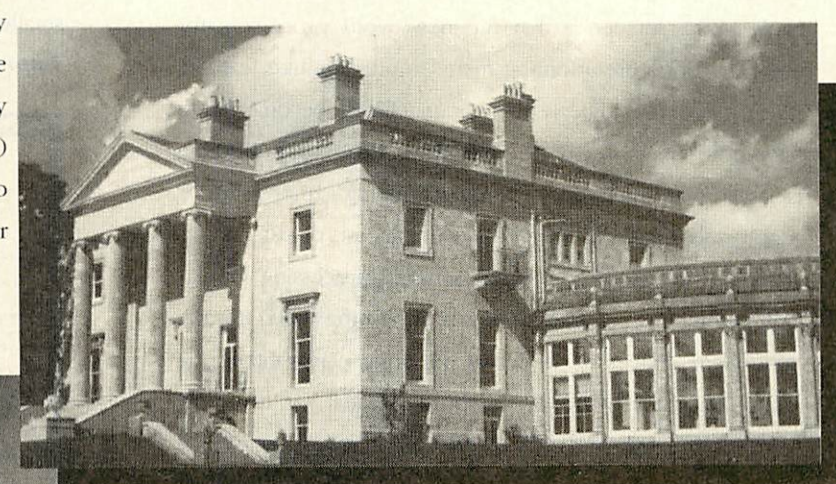
capture

While the Archimedes is powerful enough and flexible enough to handle graphics with supreme ease, this is only useful if it is equally easy to input graphics. The Scan-Light family of image scanners offers a range of capabilities and prices to suit any requirement.

There are three members of the Scan-Light family of image scanners. They are supplied with interface board and simple to use software. (Versions are available to fit internally in the A3000). And thanks to direct data exchange, once a picture has been scanned, it can be dropped directly into an Impression document (or other applications) without having to bother with filenames or having to save, then re-load as would be necessary in other systems.



The Scan-Light software includes many unique features such as instant rotation of the scanned image to any angle, image sampling to produce true grey-level images from black and white scanners, full grey-map control to alter contrast brightness etc. Over the last 18 months the Scan-Light series has become the most popular available with all types of users - home users, professional, and educational.



This image was captured from a print using the new greyscale Scan-Light Junior 256. This is able to capture, display and reproduce stunning quality half-tone photographs, although it can also scan black and white images at up to 400 dpi.

Scan-Light A4 will scan complete A4 pages, up to 400 dpi. It is shown here fitted to its optional sheet feeder. If installed with a LaserDirect printer, the software offers a quick scan-and-print photocopy facility.

Scan-Light A4 £399 +VAT (£468.82 inc)
With sheet feeder £499 +VAT (£586.32 inc)

Scan-Light Junior and Junior 256 are hand-held devices capable of capturing images up to 105mm wide (4.1inches).

Scan-Light Junior mono.. £189+VAT (£220.07 inc)
Scan-Light Junior 256 . . . £220+VAT (£258.50 inc)

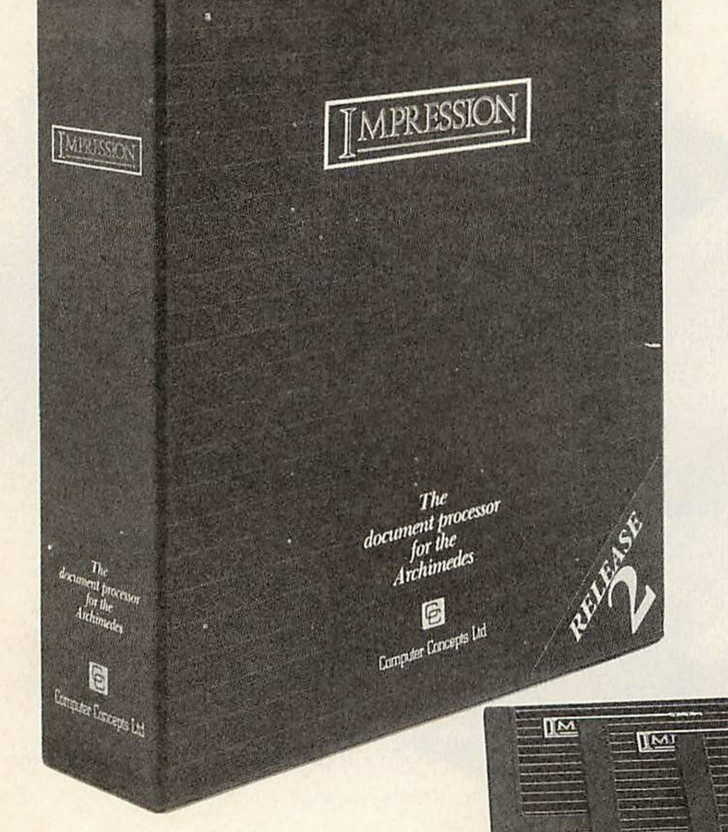


IMPRESSION II

create

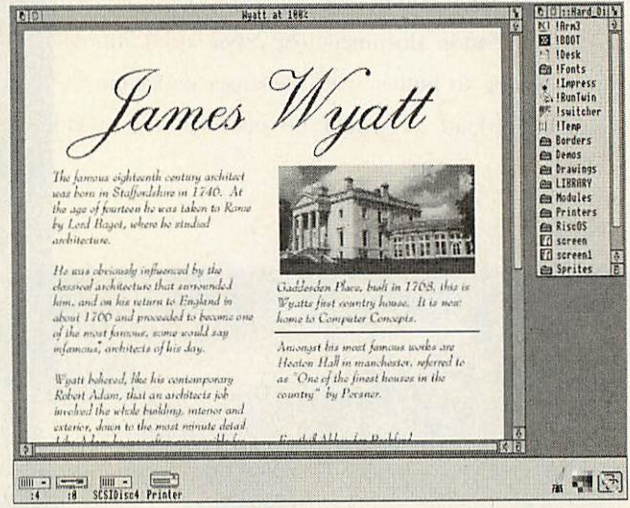


The key part of any system is the word processor. With over 10,000 users (not including the hundreds of educational site-licences installed) Impression Junior and Impression II have become an industry standard for the Archimedes, and it is still growing in popularity. It is probably no co-incidence that the new word processors for other machines are adopting many Impression-like features since it is only logical that, as machines become more powerful, they begin to integrate desk-top-publishing facilities with traditional word processing. Impression is simply the most efficient, compact, fastest product in its class, able to handle the simplest word processing jobs as well as the most complex desk-top-publishing work. It is the only word processor designed to print using either the native character mode of the printer (ideal for text only word processing and dot matrix printers) or using the RISC OS printer drivers for top quality, full page graphics and text. Imagine the freedom of near typeset quality type - any face, any size, any position on the page, with the ability to place diagrams or pictures wherever desired. Impression offers that freedom - perhaps the ultimate evolution of the word processor.



Impression Junior offers all the key Impression features. Built-in SpellMaster spelling checker, full word processing and DTP abilities, outline fancy font and character font editing, full RISC OS compatibility drives RISC OS printer drivers. It is a small compact program ideally suited for the smaller machine.

Impression Junior £89.95+VAT (£105.69 inc)



What you see on screen is always an exact representation of the final printed page, including fonts, columns and graphics.

$$J_n(x) = \frac{x^n}{2^n n!} \sum_{s=0}^{\infty} \frac{1}{s!(n+1)^s} \left(-\frac{1}{4}x^2\right)^s$$

If your word processing requirements include any equations or formulae then our Equasor product integrates with Impression to allow equations to be built up graphically, then just dropped into the Impression document where required.

Impression II is able to handle longer or more complex documents. Enhanced DTP abilities such as instant graphic rotation to any angle, Drawfile frame borders, and guide frames. It also offers unique features for long word processed documents such as contents and index generation, unlimited document length (not RAM limited), styles, in-line graphics etc.

Impression II £169+VAT (£198.57 inc)

print

Once the pictures and text have been processed and arranged as required, you need to be able to print them to the highest possible quality in the shortest possible time. Laser printers provide the quality but have traditionally been slow and expensive. The LaserDirect range of printers offers not only the highest quality printing available (to 600 dpi) but also offers by far the fastest printing available on the Archimedes and at a lower cost than traditional lasers.

LaserDirect Qume. 6 pages per minute 300 dpi. (2Mbyte machine required.)
LaserDirect Qume £999+VAT (£1173.82 inc. Postage extra)

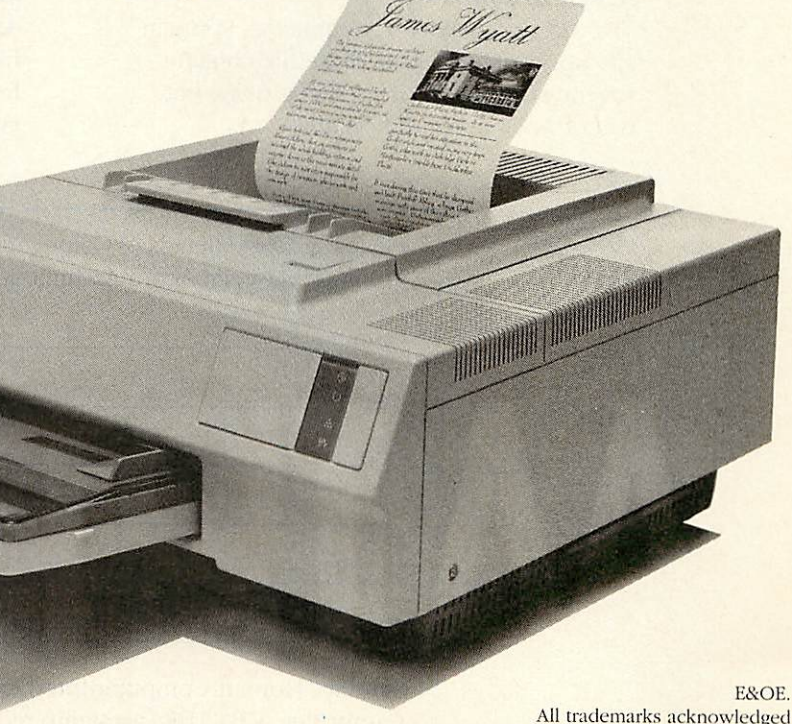
Direct drive laser printers are not a new idea. Apple Mac users have been able to buy direct drive printers for their computers for some time, but while these printers are low cost, they have the reputation of being slow. Here again Archimedes owners win because their machines have the necessary processing power to eliminate the speed problem, and the operating system facilities (such as outline fonts) to ensure that what you see on screen is really exactly what you will get on the printed page. LaserDirect printers offer print speeds of 5 to 10 times that of a typical LaserJet, at a lower cost and can also offer 600 dpi printing for a third of the cost of such printers for other machines. Indeed, so significant have been the benefits, direct drive lasers have now all but eliminated traditional laser printers from the Archimedes market, with the LaserDirect range being the most popular laser printers with Archimedes owners.

Integrated solutions

By using the Computer Concepts software and hardware products with the advanced technology of the Archimedes it is possible to create what must surely be the ultimate word and document processing system. A system that allows high quality half-tone pictures to be captured and incorporated into documents, that integrates word processing and desk-top-publishing and, finally, outputs top quality laser printed pages.

All Computer Concepts products are available direct from Computer Concepts or from all reputable dealers. More detailed brochures are available for most of our products.

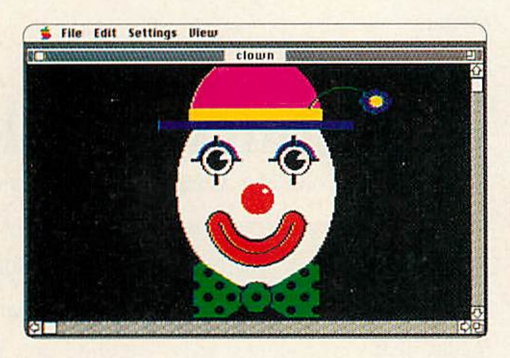
LaserDirect HiRes. 8 pages per minute and 300 or 600 dpi. (4Mbytes recommended for 600 dpi.)
LaserDirect HiRes8 £1495+VAT (£1756.62 inc. Postage extra)



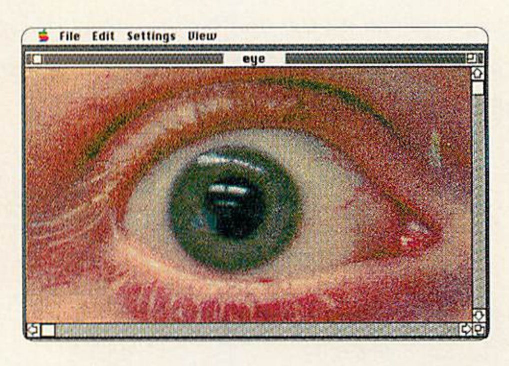
Computer Concepts Ltd

Gaddesden Place
Hemel Hempstead
Herts HP2 6EX
Tel 0442 63933 Fax 0442 231632

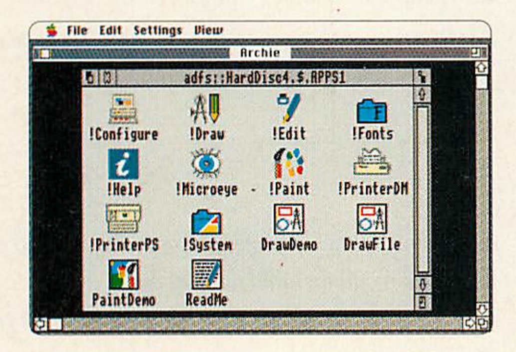
Announcing colour graphics conversion between the Acorn Archimedes and the Apple Macintosh



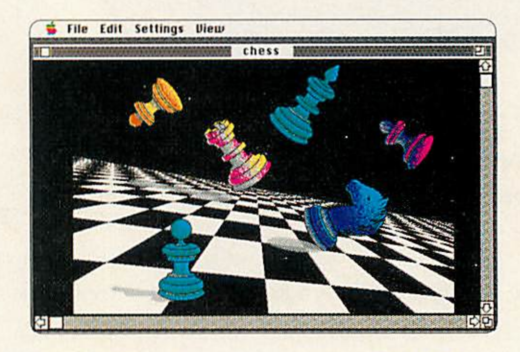
BBC Micro, Master 128, or Master Compact
Convert to or from a BBC Screen Dump in any appropriate mode, including Teletext. You can dynamically adjust the colours assigned to each logical colour in the original dump, to take account of different palette settings.



Macintosh
Convert to or from PICT, Colour PICT, or MacPaint format. Images can be manipulated in drawing and painting programs, or placed in other Macintosh applications, such as PageMaker, for subsequent colour printing.



Acorn Archimedes
Convert to or from an Archimedes Sprite in any appropriate mode. If the file contains several sprites you can select the one you want from a list of their names.



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★Info

Listing 1

```
10 REM MakeAts (Info1a)
20 REM by Garry Quested
30 REM for B/B+/M/C/E
40 REM (c) BAU Sep 91
50 :
60 MODE 1
70 HIMEM=&2900
80 code%=&2900
90 maxx%=9
100 maxy%=6
110 read=&70
120 x=&74
130 y=&75
140 n=&76
150 p=&77
160 temp=&78
170 temp2=&79
180 plot=&80
190 player=&84
200 FOR pass%=0 TO 2 STEP 2
210 P%=code%
220 [OPT pass%
230 JMP react
240 JMP showatom
250 JMP think
260 EQUD c%-code%
270 EQUD n%-code%
280 .showatom
290 AND #3
300 PHA
310 LDA #adat% MOD 256
320 STA read
330 PLA
340 CLC
350 ADC #adat% DIV 256
360 STA read+1
370 LDX #4
380 .rowloop
390 LDY #63
400 .colloop
410 LDA (read),Y
420 AND player
430 STA (plot),Y
440 DEY
450 LDA (read),Y
460 AND player+1
470 STA (plot),Y
480 DEY
490 BPL colloop
500 LDA read
510 CLC
520 ADC #64
530 STA read
540 BCC nh
550 INC read+1
560 .nh
570 LDA plot
580 CLC
590 ADC #640 MOD 256
600 STA plot
610 LDA plot+1
620 ADC #640 DIV 256
630 STA plot+1
640 DEX
650 BNE rowloop
660 RTS
670 :
680 .add
690 LDA x
700 BMI nulladd
710 CMP #maxx%+1
720 BCS nulladd
730 LDA y
740 BMI nulladd
750 CMP #maxy%+1
760 BCS nulladd
770 JSR calcn
780 LDA c%,X
790 BEQ nulladd
800 CMP p
810 BEQ nulladd
820 JSR re
830 STA temp
840 LDX n
850 LDA n%,X
860 CLC
870 ADC #4
880 SEC
890 SBC temp
900 TAX
910 LDA fives%,X
920 RTS
930 .nulladd
940 LDA #0
950 RTS
960 :
970 .calcn
980 LDA y
990 ASL A
1000 ASL A
1010 ADC y
1020 ASL A
1030 ADC x
1040 STA n
1050 TAX
1060 RTS
1070 :
1080 .fives%
1090 EQUB 1
1100 EQUB 5
1110 EQUB 25
1120 EQUB 125
1130 :
1140 .react
1150 STX x
1160 STY y
1170 .re
1180 LDX #4
1190 LDA x
1200 BEQ re2
1210 CMP #maxx%
1220 BNE re3
1230 .re2
1240 DEX
1250 .re3
1260 LDA y
1270 BEQ re4
1280 CMP #maxy%
1290 BNE re5
1300 .re4
1310 DEX
1320 .re5
1330 TXA
1340 RTS
1350 :
1360 .com2
1370 JSR re
1380 PHA
1390 INC x
1400 JSR add
1410 STA temp2
1420 LDA #0
1430 STA temp2+1
1440 DEC x
1450 INC y
1460 JSR add
1470 JSR addon
1480 DEC y
1490 DEC x
1500 JSR add
1510 JSR addon
1520 INC x
1530 DEC y
1540 JSR add
1550 JSR addon
1560 INC y
1570 JSR calcn
1580 PLA
1590 STA temp
1600 SEC
1610 SBC #1
1620 CMP n%,X
1630 BEQ com2c
1640 LDA temp2+1
1650 BNE com2a
1660 LDA temp2
1670 CMP #125
1680 BCS com2a
1690 LDA #125
1700 CLC
1710 ADC temp2
1720 STA temp2
1730 LDA #0
1740 ADC temp2+1
1750 STA temp2+1
1760 JMP com2b
1770 .com2a
1780 LDA #125
1790 SEC
1800 SBC temp2
1810 STA temp2
1820 LDA #0
1830 SBC temp2+1
1840 STA temp2+1
1850 .com2b
1860 LDA temp
1870 SEC
1880 SBC n%,X
1890 ASL A
1900 STA temp
1910 ASL A
1920 ASL A
1930 CLC
1940 ADC temp
1950 STA temp
1960 LDA temp2
1970 SEC
```




```
1980 SBC temp
1990 STA temp2
2000 LDA temp2+1
2010 SBC #0
2020 STA temp2+1
2030 RTS
2040 .com2c
2050 ASL temp2
2060 ROL temp2+1
2070 ASL temp2
2080 ROL temp2+1
2090 .com2d
2100 RTS
2110 :
2120 .addon
2130 CLC
2140 ADC temp2
2150 STA temp2
2160 BCC addon2
2170 INC temp2+1
2180 .addon2
2190 RTS
2200 :
2210 .bm
2220 EQUW 0
2230 .bi
2240 EQUB 0
2250 .bj
2260 EQUB 0
2270 :
2280 .think
2290 STA p
2300 LDA #0
2310 STA bm
2320 STA bm+1
2330 STA x
2340 .thinkloop1
2350 LDA #0
2360 STA y
2370 .thinkloop2
2380 JSR calcn
2390 LDA c%,X
2400 BEQ valid
2410 CMP p
2420 BNE next
2430 .valid
2440 JSR com2
2450 LDA temp2+1
2460 CLC
2470 ADC #&40
2480 STA temp2+1
2490 LDA temp2+1
2500 CMP bm+1
2510 BCC next
2520 BNE better
2530 LDA bm
2540 CMP temp2
2550 BCS next
2560 .better
2570 LDA temp2
2580 STA bm
2590 LDA temp2+1
2600 STA bm+1
2610 LDA x
2620 STA bi
2630 LDA y
2640 STA bj
2650 .next
2660 INC y
2670 LDA y
2680 CMP #maxy%+1
2690 BNE thinkloop2
2700 INC x
2710 LDA x
2720 CMP #maxx%+1
2730 BNE thinkloop1
2740 LDA bi
2750 LDX bj
2760 RTS
2770 ]
2780 adat%=P%
2790 P%=P%+&400
2800 c%=P%
2810 P%=P%+70
2820 n%=P%
2830 P%=P%+70
2840 NEXT pass%
2850 size%=120
2860 VDU 23,128,24,126,255,255,255,255,126,24
2870 i%=adat%
2880 FOR atoms%=0 TO 3
2890 GCOL 0,3
2900 MOVE 0,1023-size%
2910 MOVE size%,1023-size%
2920 PLOT 85,0,1023
2930 PLOT 85,size%,1023
2940 GCOL 0,0
2950 MOVE 0,1023-size%
2960 DRAW size%,1023-size%
2970 DRAW size%,1023
2980 DRAW 0,1023
2990 DRAW 0,1023-size%
3000 IF atoms%=1 PROCcircle(1/2,1/2)
3010 IF atoms%=2 PROCcircle(1/3,2/3):PROCcircle(2/3,1/3)
3020 IF atoms%=3 PROCcircle(1/2,1/4):PROCcircle(1/4,3/4):PROCcircle(3/4,3/4)
3030 FOR row%=0 TO 3
3040 FOR byte%=0 TO 63
3050 ?i%=?(&3000+640*row%+byte%)
3060 i%=i%+1
3070 NEXT
3080 NEXT
3090 NEXT
3100 PRINT"Bytes used: "P%-code%
3110 OSCLI"SAVE AtCode "+STR$~code%+" "+STR$~P%
3120 END
3130 :
3140 DEF PROCcircle(dx,dy)
3150 x=size%*dx
3160 y=1023-size%*dy
3170 MOVE x-16,y+16
3180 VDU 5,128,4
3190 ENDPROC
```

Listing 2

```
10 REM Atoms8 (Info1b)
20 REM by Garry Quested
30 REM for B/B+/M/E/C
40 REM (c) BAU September 1991
50 :
60 MODE 1
70 HIMEM=&2900
80 PROCinit
90 PROCwind
100 playing%=2
110 con%(1)=1
120 con%(2)=0
130 PROCnewgame
140 REPEAT
150 PROCnewgame
160 PROCmenu
170 stillplaying%=playing%
180 REPEAT
190 gameover%=FALSE
200 FOR p%=1 TO playing%
210 PROCshowplayers(p%)
220 IF count%(p%)>=0 PROCplay(p%):IF stillplaying%=1 winner%=p%:gameover%=TRUE
230 NEXT
240 UNTIL gameover%
250 PROCshowplayers(winner%)
260 PROCm("Player "+STR$winner%+" has won!",0)
270 PROCm("Press a key...",2)
280 wait=GET
290 UNTIL FALSE
300 END
310 :
320 DEF PROCmenu
330 p%=0
340 PROCshowcols
350 REPEAT
360 PROCshowplayers(p%+1)
370 PROCm("Atoms",0)
380 PROCm("Press S to start",2)
390 REPEAT
400 key%=INSTR(" 2""3#4$5%6&Ss"+CHR$136+" "+CHR$137+" "+CHR$13,INKEY$(10))/2
410 UNTIL key%>0
420 IF key%>=1 AND key%<=5 playing%=key%+1
430 IF key%=7 p%=(p%+playing%-1) MOD playing%
440 IF key%=8 p%=(p%+1) MOD playing%
450 IF key%=9 con%(p%+1)=1-con%(p%+1)
460 IF p%>playing%-1 p%=playing%-1
470 IF key%<7 OR key%=9 CLS:PROCshowcols
480 UNTIL key%=6
490 ENDPROC
500 :
510 DEF PROCplay(p%)
520 IF con%(p%)=0 PROCcomputer(p%) ELSE PROChuman(p%)
530 ENDPROC
540 :
550 DEF PROChuman(p%)
560 SOUND 1,-10,129,3
570 SOUND 1,-10,117,3
580 PROCm("Your move",0)
590 PROCindic
600 gotmove%=FALSE
610 REPEAT
620 key%=GET
630 IF key%=136 PROCmovei(-1,0)
640 IF key%=137 PROCmovei(1,0)
650 IF key%=138 PROCmovei(0,-1)
660 IF key%=139 PROCmovei(0,1)
670 IF key%=13 AND (FNn(ix%,iy%)=0 OR c%?(ix%+10*iy%)=p%) THEN gotmove%=TRUE
680 UNTIL gotmove%
690 PROCindic
700 PROCreact(ix%,iy%)
710 ENDPROC
720 :
730 DEF PROCmovei(dx%,dy%)
740 PROCindic
750 ix%=(ix%+10+dx%) MOD 10
760 iy%=(iy%+7+dy%) MOD 7
770 PROCindic
780 ENDPROC
790 :
800 DEF PROCindic
810 GCOL 4,3
820 MOVE ix%*128,4+iy%*128
830 PLOT 1,120,0
840 PLOT 1,0,120
850 PLOT 1,-120,0
860 PLOT 1,0,-120
870 ENDPROC
880 :
890 DEF PROCcomputer(A%)
900 PROCm("Thinking...",0)
910 A%=USR(code%+6)
920 PROCreact(A% AND &FF,(A% AND &FF00) DIV &100)
930 ENDPROC
940 :
950 DEF PROCreact(x%,y%)
960 IF stillplaying%<2 ENDPROC
970 oldp%=c%?(x%+10*y%)
980 count%(oldp%)=count%(oldp%)-FNn(x%,y%)
990 n%?(x%+10*y%)=FNn(x%,y%)+1
1000 count%(p%)=count%(p%)+FNn(x%,y%)
1010 c%?(x%+10*y%)=p%
1020 PROCshowat(x%,y%)
1030 IF oldp%>0 AND count%(oldp%)=0 THEN count%(oldp%)=-1:stillplaying%=stillplaying%-1:PROCshowcols
1040 reactor%=FNre(x%,y%)
1050 IF FNn(x%,y%)>=reactor% PROCexplode(x%,y%,reactor%)
1060 ENDPROC
1070 :
1080 DEF PROCexplode(x%,y%,reactor%)
1090 n%?(x%+10*y%)=FNn(x%,y%)-reactor%
1100 count%(p%)=count%(p%)-reactor%
1110 PROCshowat(x%,y%)
1120 IF x%>0 PROCreact(x%-1,y%)
1130 IF x%<maxx% PROCreact(x%+1,y%)
1140 IF y%>0 PROCreact(x%,y%-1)
1150 IF y%<maxy% PROCreact(x%,y%+1)
1160 PROCshowat(x%,y%)
1170 ENDPROC
1180 :
1190 DEF PROCnewgame
1200 FOR p%=1 TO maxplayers%
1210 count%(p%)=0
1220 NEXT
1230 FOR i%=0 TO maxx%
1240 FOR j%=0 TO maxy%
1250 n%?(i%+10*j%)=0
1260 c%?(i%+10*j%)=0
1270 PROCshowat(i%,j%)
1280 NEXT
1290 NEXT
1300 ix%=0
1310 iy%=0
1320 ENDPROC
1330 :
1340 DEF PROCshowat(x%,y%)
1350 !plot=&3000+4*640*(7-y%)+64*x%
1360 A%=FNn(x%,y%)
1370 IF A%=0 col%=0 ELSE col%=c%?(x%+10*y%)
1380 IF col%=0 THEN !player=&AA55 ELSE !player=!(&3000+48*(col%-1))
1390 CALL code%+3
1400 ENDPROC
1410 :
1420 DEF PROCinit
1430 VDU 19,2,4,0,0,0
1440 VDU 23,224,170,85,170,85,170,85,170,85
1450 VDU 23,225,24,60,126,255,24,24,24,24
1460 code%=&2900
1470 OSCLI"LOAD AtCode "+STR$~code%
1480 c%=code%+code%!9
1490 n%=code%+code%!13
1500 maxx%=9
1510 maxy%=6
1520 plot=&80
1530 player=&84
1540 maxplayers%=6
1550 playing%=6
1560 DIM con%(maxplayers%),count%(maxplayers%)
1570 *FX 4,1
1580 ENDPROC
1590 :
1600 DEF PROCm(m$,y%)
1610 PRINTTAB(20,y%)SPC20;TAB(30-LEN(m$)/2,y%)m$
1620 ENDPROC
1630 :
1640 DEF PROCshowcols
1650 RESTORE
1660 FOR i%=0 TO playing%-1
1670 READ c1%,c2%
1680 FOR j%=0 TO 1
1690 PRINT TAB(i%*3,j%);
1700 COLOUR c1%
1710 COLOUR 128+c2%
1720 IF c1%=c2% VDU 32,32 ELSE VDU 224,224
1730 VDU 9
1740 NEXT
1750 VDU 5
1760 GCOL 0,0
1770 PROCch(0,4)
1780 PROCch(0,-4)
1790 PROCch(4,0)
1800 PROCch(-4,0)
1810 GCOL 0,3
1820 PROCch(0,0)
1830 VDU 4
1840 PROCwind
1850 NEXT
1860 COLOUR 128
1870 COLOUR 7
1880 ENDPROC
1890 :
1900 DEF PROCch(dx%,dy%)
1910 IF count%(i%+1)<0 ENDPROC
1920 MOVE 96*i%+16+dx%,1003+dy%
1930 IF con%(i%+1)=0 VDU 67 ELSE VDU 72
1940 ENDPROC
1950 :
1960 DEF PROCshowplayers(p%)
1970 VDU 5
1980 FOR i%=1 TO playing%
1990 IF i%=p% GCOL 0,3 ELSE GCOL 0,0
2000 MOVE 96*i%-80,951
2010 VDU 225
2020 NEXT
2030 VDU 4
2040 PROCwind
2050 ENDPROC
2060 :
2070 DEF FNn(i%,j%)=n%?(i%+10*j%)
2080 :
2090 DEF PROCwind
2100 VDU 23;8202;0;0;0;28,0,3,39,0
2110 ENDPROC
2120 :
2130 DEF FNre(X%,Y%)=USR(code%) AND &FF
2140 :
2150 DATA 1,0,3,3,1,2,1,1,2,3,2,2
```

Listing 3

```
10 REM >Coral32  (Info2a)
20 REM By Jan Vlietinck
30 REM For Archimedes only
40 REM (c) BAU September 1991
50 :
60 ON ERROR PROCerror
70 MODE 13:OFF
80 PROCinit
90 PROCcode
100 PROCcoral
110 END
120 :
130 DEF PROCerror
140 IF ERR = 17 AND NOT INKEY-2 RUN
150 MODE 0
160 IF ERR <> 17 PRINTREPORT$;" at line ";ERL
170 END
180 :
190 DEF PROCinit
200 DIM code 1000
210 shift = 3
220 val   = 4
230 rnd1  = 5
240 rnd2  = 6
250 count = 7
260 scrn  = 8
270 addr  = 9
280 x     = 10
290 y     = 11
300 link  = 14
310 pc    = 15
320 ENDPROC
330 :
340 DEF PROCcode
350 FOR pass=0 TO 2 STEP 2
360 P%=code
370 [OPT pass
380 .coral  ADD     shift,R0,#11
390 ADD     val,R1,#16
400 MOV     rnd1,R2
410 MOV     rnd2,R3
420 LDR     scrn,scrn%
430 MOV     count,#1<<20
440 .loop   ADD     rnd1,rnd1,rnd1,LSL #2
450 ADD     rnd2,rnd2,rnd2,LSL #2
460 MOV     x,rnd1,LSR #24
470 MOV     y,rnd2,LSR #24
480 CMP     y,#1
490 BLS     loop
500 CMP     y,#254
510 BHS     loop
520 ADD     x,x,#32
530 ADD     addr,y,y,LSL #2
540 ADD     addr,scrn,addr,LSL #6
550 LDRB    R0,[addr,x]!
560 CMP     R0,#0
570 SUBNES  count,count,#1
580 BNE     loop
590 LDRB    R1,[addr,# 1]
600 LDRB    R0,[addr,#-1]
610 ADD     R1,R1,R0
620 LDRB    R0,[addr,# 320]
630 ADD     R1,R1,R0
640 LDRB    R0,[addr,#-320]
650 ADD     R1,R1,R0
660 LDRB    R0,[addr,# 319]
670 ADD     R1,R1,R0
680 LDRB    R0,[addr,#-319]
690 ADD     R1,R1,R0
700 LDRB    R0,[addr,# 321]
710 ADD     R1,R1,R0
720 LDRB    R0,[addr,#-321]
730 ADDS    R1,R1,R0
740 ADD     R0,val,count,LSR shift
750 STRNEB  R0,[addr]
760 SUBS    count,count,#1
770 BPL     loop
780 MOV     pc,link
790 :
800 .scrn%  EQUD    148
810 EQUD    -1
820 ]NEXT
830 SYS "OS_ReadVduVariables",scrn%,scrn%
840 ENDPROC
```

```
850 :
860 DEF PROCcoral
870 *POINTER
880 MOUSE ON
890 MOUSE RECTANGLE 124,4,1028,1012
900 held=FALSE
910 REPEAT
920 CLS
930 RECTANGLE 120,0,1036,1020
940 REPEAT
950 REPEAT
960 MOUSE x,y,z
970 IF z=0 held=FALSE
980 UNTIL z AND NOT held
990 IF z AND 4 THEN
1000 IF NOT held POINT x,y
1010 ELSE
1020 held=FALSE
1030 ENDIF
1040 IF z AND 1 THEN
1050 WAIT
1060 rx=x+RND(200)-100
1070 ry=y+RND(200)-100
1080 IF rx<124 rx=124
1090 IF rx>1028+124 rx=1028+124
1100 IF ry<4 ry=4
1110 IF ry>1012+4 ry=1012+4
1120 POINT rx,ry
1130 ENDIF
1140 UNTIL z=2
1150 A%=RND(9)
1160 B%=RND(200)
1170 C%=RND
1180 D%=RND
1190 CALL coral
1200 REPEAT
1210 MOUSE x,y,z
1220 held=TRUE
1230 UNTIL z
1240 UNTIL 0
1250 ENDPROC
```

Listing 4

```
10 REM Coral8 (Info2b)
20 REM By Jan Vlietinck
30 REM 8 Bit Version by Dave Lawrence
40 REM For all 8 Bit machines
50 REM (c) BAU September 1991
60 :
70 ON ERROR GOTO 150
80 MODE 2
90 VDU 23;8202;0;0;0;0;
100 PROCinit
110 PROCcode
120 PROCcoral
130 END
140 :
150 IF ERR = 17 AND NOT INKEY-2 GOTO 1
20
160 MODE 7
170 IF ERR <> 17 REPORT:PRINT" at line
";ERL
180 END
190 :
200 DEF PROCinit
210 DIM code 800
220 xsize=160
230 ysize=128
240 counter=xsize*ysize*16
250 linelength=20*8*4
260 zp=&70
270 count=FNzp(4)
280 rnd1=FNzp(4)
290 rnd2=FNzp(4)
300 tmp=FNzp(4)
310 x=FNzp(1)
320 y=FNzp(1)
330 addr=FNzp(2)
340 addr2=FNzp(2)
350 mask=FNzp(1)
360 nextmask=FNzp(1)
370 col=FNzp(1)
380 row=FNzp(1)
390 colour=FNzp(1)
400 colcount=FNzp(1)
410 coldelay=FNzp(1)
420 coladd=FNzp(1)
430 ENDPROC
440 :
450 DEF PROCcode
460 FOR pass=0 TO 2 STEP 2
470 P%=code
480 [OPT pass
490 .coral
500 STA colour
510 STX coldelay
520 STX colcount
530 STY coladd
540 .loop
550 OPT FNmul5(rnd1)
560 OPT FNmul5(rnd2)
570 LDA rnd1+3
580 BEQ loop
590 CMP #159
600 BCS loop
610 AND #1
620 STA col
630 TAX
640 LDA masks,X
650 STA mask
660 LDA nextmasks,X
670 STA nextmask
680 LDA rnd2+3
690 LSR A
700 TAY
710 BNE ynot0
720 .jloop
730 JMP loop
740 .ynot0
750 CMP #127
760 BEQ jloop
770 AND #3
780 STA row
790 LDA #0
800 STA addr+1
810 LDA rnd1+3
820 AND #&FE
830 ASL A
840 ROL addr+1
850 ASL A
860 ROL addr+1
870 CLC
880 ADC scrlo,Y
890 STA addr
900 LDA addr+1
910 ADC scrhi,Y
920 STA addr+1
930 LDY #10
940 LDA (addr),Y
950 AND mask
960 BEQ squareempty
970 JMP alldone
980 .squareempty
990 LDA col
1000 BNE midrow
1010 LDY #2
1020 .midrow
1030 LDA (addr),Y
1040 AND nextmask
1050 BNE midjmp
1060 TYA
1070 CLC
1080 ADC #8
1090 TAY
1100 LDA (addr),Y
1110 AND nextmask
1120 BEQ endmid
1130 .midjmp
1140 JMP doplot
1150 .endmid
1160 LDA row
1170 BEQ cantdotop
1180 LDX #8
1190 LDY #8
1200 LDA col
1210 BNE toprow
1220 LDY #0
1230 .toprow
1240 LDA (addr),Y
1250 AND nextmask
1260 BNE topjmp
1270 TYA
1280 CLC
1290 ADC #8
1300 TAY
1310 LDA (addr),Y
1320 AND nextmask
1330 BNE topjmp
1340 TXA
1350 TAY
1360 LDA (addr),Y
1370 AND mask
1380 BEQ endtop
1390 .topjmp
1400 JMP doplot
1410 .endtop
1420 LDA row
1430 CMP #3
1440 BEQ addline
1450 .cantdotop
1460 LDX #12
1470 LDY #12
1480 LDA col
1490 BNE botrow
1500 LDY #4
1510 .botrow
1520 LDA (addr),Y
1530 AND nextmask
1540 BNE botjmp
1550 TYA
1560 CLC
1570 ADC #8
1580 TAY
1590 LDA (addr),Y
1600 AND nextmask
1610 BNE botjmp
1620 TXA
1630 TAY
1640 LDA (addr),Y
1650 AND mask
1660 BEQ endbot
1670 .botjmp
1680 JMP doplot
1690 .endbot
1700 LDA row
1710 BNE alldone
1720 LDA addr
1730 SEC
1740 SBC #linelength MOD 256
1750 STA addr2
1760 LDA addr+1
1770 SBC #linelength DIV 256
1780 STA addr2+1
1790 LDX #16
1800 LDY #16
1810 LDA col
1820 BNE lowest
1830 LDY #8
1840 .lowest
1850 LDA (addr2),Y
1860 AND nextmask
1870 BNE lowjmp
1880 TYA
1890 CLC
1900 ADC #8
1910 TAY
1920 LDA (addr2),Y
1930 AND nextmask
1940 BNE lowjmp
1950 TXA
1960 TAY
1970 LDA (addr2),Y
1980 AND mask
1990 BEQ endlow
2000 .lowjmp
2010 JMP doplot
2020 .endlow
2030 JMP alldone
2040 .addline
2050 LDA addr
2060 CLC
2070 ADC #(linelength-4) MOD 256
2080 STA addr2
2090 LDA addr+1
2100 ADC #(linelength-4) DIV 256
2110 STA addr2+1
2120 LDX #8
2130 LDY #8
2140 LDA col
2150 BNE highest
2160 LDY #0
2170 .highest
2180 LDA (addr2),Y
2190 AND nextmask
2200 BNE doplot
2210 TYA
2220 CLC
2230 ADC #8
2240 TAY
2250 LDA (addr2),Y
2260 AND nextmask
2270 BNE doplot
2280 TXA
2290 TAY
2300 LDA (addr2),Y
2310 AND mask
2320 BEQ alldone
2330 .doplot
2340 LDX colour
2350 LDA colours,X
2360 AND mask
2370 PHA
2380 LDY #10
2390 ORA (addr),Y
2400 STA (addr),Y
2410 INY
2420 PLA
2430 ORA (addr),Y
2440 STA (addr),Y
2450 .alldone
2460 DEC count
2470 LDA count
2480 CMP #255
2490 BNE jmploop
2500 DEC colcount
2510 BNE nochange
2520 LDA coldelay
2530 STA colcount
2540 LDA colour
2550 CLC
2560 ADC coladd
2570 CMP #7
2580 BCC lessthan7
2590 SBC #7
2600 .lessthan7
2610 STA colour
2620 .nochange
2630 DEC count+1
2640 LDA count+1
2650 CMP #255
2660 BNE jmploop
2670 DEC count+2
2680 LDA count+2
2690 CMP #255
2700 BEQ exit
2710 .jmploop
2720 BIT &FF
2730 BMI exit
2740 JMP loop
2750 .exit
2760 RTS
2770 :
2780 .masks
2790 EQUB 42
2800 .nextmasks
2810 EQUB 21
2820 EQUB 42
2830 :
2840 .colours
2850 EQUB &30:EQUB &03:EQUB &33
2860 EQUB &0C:EQUB &3C:EQUB &0F:EQUB &3
F
2870 ]
2880 scrlo=FNmem(128)
2890 scrhi=FNmem(128)
2900 NEXT
2910 FOR y=0 TO 127
2920 ad=&3000+(y DIV 4)*linelength+2*(y
MOD 4)-10
2930 scrlo?y=ad MOD 256
2940 scrhi?y=ad DIV 256
2950 NEXT
2960 ENDPROC
2970 :
2980 DEF FNzp(n)
2990 zp=zp+n
3000 =zp-n
3010 :
3020 DEF FNmem(n)
3030 P%=P%+n
3040 =P%-n
3050 :
3060 DEF FNmul5(ad)
3070 [OPT pass
3080 LDA ad
3090 STA tmp
3100 LDA ad+1
3110 STA tmp+1
3120 LDA ad+2
3130 STA tmp+2
3140 LDA ad+3
3150 STA tmp+3
3160 ASL ad
3170 ROL ad+1
3180 ROL ad+2
3190 ROL ad+3
3200 ASL ad
3210 ROL ad+1
3220 ROL ad+2
3230 ROL ad+3
3240 LDA ad
3250 CLC
3260 ADC tmp
3270 STA ad
3280 LDA ad+1
3290 ADC tmp+1
3300 STA ad+1
3310 LDA ad+2
3320 ADC tmp+2
3330 STA ad+2
3340 LDA ad+3
3350 ADC tmp+3
3360 STA ad+3
3370 ]
3380 =pass
3390 :
3400 DEF PROCcoral
3410 REPEAT
3420 CLS
3430 FOR i=1 TO 10
3440 x=RND(160)-1
3450 y=RND(128)-1
3460 PLOT 69,x*8,y*8
3470 PLOT 69,x*8,y*8+4
3480 NEXT
3490 !count=counter
3500 !rnd1=RND
3510 !rnd2=RND
3520 A%=RND(7)-1
3530 X%=RND(200)+50
3540 Y%=(RND(2)-1)*5+1
3550 CALL coral
3560 VDU 7
3570 IFGET
3580 UNTIL FALSE
3590 ENDPROC
```

Listing 5

```
10 REM >%.Biggest
20 REM By Dave Lawrence
30 REM For Archimedes only
40 REM (c) BAU Sep 91
50 :
60 PROCinit
70 arg$=FNgetargs
80 PROCreadargs(arg$)
90 IF help% THEN
100 PRINT"Find large files and directo
ries"'
110 PRINT"Keywords:"'
120 PRINT"Upper case indicates allowab
le abbreviation"
130 FOR arg%=0 TO args%-1
140 PROCp("-"+arg$(arg%,0),arg$(arg%,2
))
150 NEXT
160 ELSE
170 PROCsetup
180 IF verbose% PRINTroot$;
190 PROCcount(root$)
200 IF verbose% PRINTSTRING$(LENroot$,
CHR$127);
210 PROCresults
220 ENDIF
230 END
240 :
250 DATA 12
260 DATA Number,/e,"Number of objects
to display (default 30)"
270 DATA Type,=types/k,"Filetype[s] to
 count (separated by semicolons)"
280 DATA Exclude,/k,"Filetype[s] to ex
clude (separated by semicolons)"
290 DATA Directories,/s,"Count directo
ries rather than files"
300 DATA Applications,/s,"Count Risc O
S applications (identified by !RunImage)
"
310 DATA Root,/k,"Set directory to sta
rt from (default $)"
320 DATA Single,/s,"Only count 'Root'
directory (don't recurse)"
```

```
  330 DATA Format,/k,"Set file size format (Decimal, Hexadecimal, Textual)"
  340 DATA Path,/s,"Print full pathnames rather than file and path"
  350 DATA SPlit,=sp/s,"Print pathnames on a new line"
  360 DATA Verbose,/s,"Display directories searched"
  370 DATA Help,/s,"Display this help"
  380 :
  390 DEF PROCp(c$,h$)
  400 SYS "OS_PrettyPrint",c$+STRING$(14-LENc$,CHR$31)+": "+h$+CHR$10+CHR$13+CHR$0
  410 ENDPROC
  420 :
  430 DEF FNgetargs
  440 SYS "OS_GetEnv" TO A$
  450 A$=FNlow(A$)
  460 quit=INSTR(A$,"-quit")
  470 A$=MID$(A$,quit+6)
  480 spc=INSTR(A$," ")
  490 A$=MID$(A$,spc+1)
  500 =A$
  510 :
  520 DEF PROCinit
  530 READ args%
  540 DIM ftypes%(&FFF),arg$(args%-1,2),form$(2),block 256
  550 form$()="decimal","hexadecimal","textual"
  560 dec%=0:hex%=1:text%=2:formats%=3
  570 name=block+&14
  580 key$=""
  590 FOR arg%=0 TO args%-1
  600 READ arg$(arg%,0),arg$(arg%,1),arg$(arg%,2)
  610 IF key$<>"" key$+=","
  620 key$+=(FNlow(arg$(arg%,0))+arg$(arg%,1))
  630 NEXT
  640 ENDPROC
  650 :
  660 DEF PROCreadargs(arg$)
  670 ftypes%()=TRUE
  680 SYS "OS_ReadArgs",key$,arg$,block,&100
  690 number%  = FNval(0)
  700 types%   = FNval(1)
  710 exclude% = FNval(2)
  720 dirs%    = FNval(3)
  730 apps%    = FNval(4)
  740 root%    = FNval(5)
  750 single%  = FNval(6)
  760 format%  = FNval(7)
  770 path%    = FNval(8)
  780 split%   = FNval(9)
  790 verbose% = FNval(10)
  800 help%    = FNval(11)
  810 ENDPROC
  820 :
  830 DEF FNval(arg%)
  840 LOCAL val%
  850 val%=block!(arg%*4)
  860 IF RIGHT$(arg$(arg%,1))="s" THEN =(val%<>0)
  870 =val%
  880 :
  890 DEF PROCsetup
  900 flag%=-(types%>0)-(exclude%>0)-apps%-dirs%
  910 files%=(types%>0) OR (exclude%>0) OR (flag%=0)
  920 IF flag%>1 ERROR 0,"Multiple search parameters"
  930 IF number%=0 number%=30 ELSE number%=number%!1
  940 IF types%>0 THEN
  950 ftypes%()=FALSE
  960 PROCextracttypes(FNstr0(types%),TRUE)
  970 ENDIF
  980 IF exclude%>0 THEN
  990 ftypes%()=TRUE
 1000 PROCextracttypes(FNstr0(exclude%),FALSE)
 1010 ENDIF
 1020 IF root%=0 THEN
 1030 root$="$"
 1040 ELSE
 1050 root$=FNstr0(root%)
 1060 ENDIF
 1070 IF format%<>0 THEN
 1080 form$=FNlow(FNstr0(format%))
 1090 format%=-1
 1100 FOR i%=0 TO formats%-1
 1110 IF form$=LEFT$(form$(i%),LENform$) format%=i%
 1120 NEXT
 1130 IF format%<0 ERROR 0,"Unknown output format"
 1140 ENDIF
 1150 IF dirs% single%=TRUE
 1160 DIM file$(number%+1),path$(number%+1),type$(number%+1),size%(number%+1)
 1170 ENDPROC
 1180 :
 1190 DEF FNstr0(a%)
 1200 a$=""
 1210 WHILE ?a%<>0
 1220 a$+=CHR$(?a%)
 1230 a%+=1
 1240 ENDWHILE
 1250 =a$
 1260 :
 1270 DEF PROCextracttypes(a$,flag%)
 1280 LOCAL semi,type$,type
 1290 a$+=";"
 1300 REPEAT
 1310 semi=INSTR(a$,";")
 1320 type$=LEFT$(a$,semi-1)
 1330 IF LEFT$(type$,1)="&" THEN
 1340 type=EVAL(type$)
 1350 ELSE
 1360 SYS "OS_FSControl",31,type$ TO ,,type
 1370 ENDIF
 1380 ftypes%(type)=flag%
 1390 a$=MID$(a$,semi+1)
 1400 UNTIL a$=""
 1410 ENDPROC
 1420 :
 1430 DEF FNfiletype(t%)
 1440 LOCAL a,b,blk
 1450 DIM blk 8
 1460 SYS "OS_FSControl",18,,t% TO ,,a,b
 1470 !blk=a:blk!4=b:blk?8=13
 1480 =$blk
 1490 :
 1500 DEF FNlow(i$)
 1510 LOCAL i%,c%,o$
 1520 FOR i%=1 TO LEN(i$)
 1530 c%=ASCMID$(i$,i%,1)
 1540 IF c%>=ASC"A" AND c%<=ASC"Z" c%=c%+32
 1550 o$+=CHR$c%
 1560 NEXT
 1570 =o$
 1580 :
 1590 DEF PROCcount(dir$)
 1600 LOCAL ptr,len
 1610 ptr=0
 1620 REPEAT
 1630 SYS "OS_GBPB",10,dir$,block,1,ptr,50 TO ,,,,ptr
 1640 IF ptr>=0 THEN
 1650 name$=FNstr0(name)
 1660 CASE block!&10 OF
 1670 WHEN 1:
 1680 IF files% THEN
 1690 ftype%=(!block AND &000FFF00)>>8
 1700 IF ftypes%(ftype%) THEN
 1710 len%=block!&8
 1720 PROCinsert(name$,dir$,FNfiletype(ftype%),len%)
 1730 ENDIF
 1740 ENDIF
 1750 WHEN 2:
 1760 IF dirs% OR apps% THEN
 1770 IF apps% THEN
 1780 SYS "OS_File",5,dir$+"."+name$+".!RunImage" TO count%
 1790 ELSE
 1800 count%=TRUE
 1810 ENDIF
 1820 IF count% THEN
 1830 SYS "OS_FSControl",28,dir$+"."+name$,,1 TO ,,bytes,files
 1840 PROCinsert(name$,dir$,"",bytes)
 1850 ENDIF
 1860 ENDIF
 1870 IF NOT single% THEN
 1880 IF verbose% PRINT".";name$;:len=LENname$
 1890 PROCcount(dir$+"."+name$)
 1900 IF verbose% PRINTSTRING$(len+1,CHR$127);
 1910 ENDIF
 1920 ENDCASE
 1930 ENDIF
 1940 UNTIL ptr=-1
 1950 ENDPROC
 1960 :
 1970 DEF PROCinsert(file$,path$,type$,size)
 1980 IF size>size%(number%) THEN
 1990 pos%=number%
 2000 REPEAT
 2010 pos%-=1
 2020 UNTIL pos%=0 OR size<size%(pos%)
 2030 pos%+=1
 2040 FOR i%=number% TO pos% STEP -1
 2050 file$(i%+1)=file$(i%)
 2060 path$(i%+1)=path$(i%)
 2070 type$(i%+1)=type$(i%)
 2080 size%(i%+1)=size%(i%)
 2090 NEXT
 2100 file$(pos%)=file$
 2110 path$(pos%)=path$
 2120 type$(pos%)=type$
 2130 size%(pos%)=size
 2140 ENDIF
 2150 ENDPROC
 2160 :
 2170 DEF PROCresults
 2180 i%=1
 2190 WHILE i%<=number% AND file$(i%)<>""
 2200 CASE format% OF
 2210 WHEN dec%:
 2220 size$=STR$size%(i%)
 2230 WHEN hex%:
 2240 size$="&"+RIGHT$(STRING$(8,"0")+STR$~size%(i%),8)
 2250 WHEN text%:
 2260 SYS "OS_ConvertFixedFileSize",size%(i%),block,256
 2270 size$=FNstr0(block)
 2280 ENDCASE
 2290 size$=RIGHT$(STRING$(12," ")+size$,12)+"  "
 2300 IF files% THEN
 2310 type$=type$(i%)+"  "
 2320 ELSE
 2330 type$=""
 2340 ENDIF
 2350 IF path% THEN
 2360 path$=path$(i%)+"."+file$(i%)
 2370 file$=""
 2380 ELSE
 2390 file$=LEFT$(file$(i%)+STRING$(12," "),12)
 2400 path$=path$(i%)
 2410 ENDIF
 2420 IF split% AND files% THEN
 2430 PRINTsize$;type$'SPC14;file$;path$
 2440 ELSE
 2450 PRINTsize$;file$;type$;path$
 2460 ENDIF
 2470 i%+=1
 2480 ENDWHILE
 2490 ENDPROC
```

Listing 6

```
   10 REM Big8  (Info3b)
   20 REM Show biggest files
   30 REM by Dave Acton
   40 REM for B/B+/M/C/E
   50 REM (c) BAU September 1991
   60 :
   70 MODE 7
   80 VDU 23;8202;0;0;0;
   90 *FX 4,1
  100 PROCtitle("BAU File & Directory Counter")
  110 maxfiles%=20
  120 fdatsize%=100
  130 DIM filedat% maxfiles%*fdatsize%
  140 DIM next%(maxfiles%)
  150 DIM temp% &100,q% &100
  160 DIM m$(10)
  170 DIM type$(20),func$(20),sel%(20)
  180 func%=0
  190 REPEAT
  200 READ type$(func%)
  210 i%=INSTR(type$(func%)," ")
  220 IF i%>0 func$(func%)=LEFT$(type$(func%),i%-1) ELSE func$(func%)=type$(func%)
  230 typemen$=typemen$+","+type$(func%)
  240 func%=func%+1
  250 UNTIL type$(func%-1)="Other"
  260 func%=func%-1
  270 seldir$="$"
  280 which%=0
  290 verbose%=FALSE
  300 recur%=TRUE
  310 ON ERROR PROCerr
  320 REPEAT
  330 m$="Start search,Select root,Select type,"+FNtick(verbose%)+"Verbose,"+FNtick(recur%)+"Recurse,Quit"
  340 choice%=FNmenu(m$,choice%,"Dir: "+FNfname(seldir$,30))
  350 IF choice%=0 PROCbiggest(seldir$,5-15*(NOT verbose%)):PROCgetakey
  360 IF choice%=1 PROCgetdir
  370 IF choice%=2 PROCtypemenu
  380 IF choice%=3 verbose%=NOT verbose%
  390 IF choice%=4 recur%=NOT recur%
  400 UNTIL choice%=5
  410 *FX 4,0
  420 MODE 7
  430 END
  440 :
  450 DEF PROCerr
  460 IF ERR=17 ENDPROC
  470 CLS
  480 PRINTCHR$129CHR$136"Error: "CHR$137;
  490 REPORT
  500 PROCgetakey
  510 ENDPROC
  520 :
  530 DEF PROCgetdir
  540 REPEAT
  550 CLS
  560 PRINT" Enter directory to search:"
  570 INPUT"   >"seldir$
  580 UNTIL FNtype(seldir$)=2
  590 ENDPROC
  600 :
  610 DEF PROCtypemenu
  620 LOCAL choice%,m$,i%
  630 choice%=0
  640 REPEAT
  650 m$=FNtick(which%=0)+"All files,"
  660 m$=m$+FNtick(which%=1)+"Directory,"
  670 FOR i%=0 TO func%-1
  680 m$=m$+FNtick(which%=0 OR (which%=2 AND sel%(i%)))+type$(i%)+","
  690 NEXT
  700 m$=m$+"Main menu"
  710 choice%=FNmenu(m$,choice%,"Select type(s) to search for")
  720
  730 IF choice%<2 which%=choice%
  740 IF choice%>=2 AND choice%<func%+2 sel%(choice%-2)=NOT sel%(choice%-2):which%=2
  750 UNTIL choice%=func%+2
  760 ENDPROC
  770 :
  780 DEF FNtick(cond%)
  790 IF cond% THEN ="#1" ELSE ="#0"
  800 :
  810 DEF PROCgetakey
  820 PROCstatus("Press a key to return to menu...")
  830 *FX 15,1
  840 wait=GET
  850 ENDPROC
  860 :
  870 DEF FNyn(yn%)
  880 IF yn%=0 THEN ="  " ELSE ="] "
  890 :
  900 DEF FNmenu(men$,choice%,stat$)
  910 items%=0
  920 REPEAT
  930 i%=INSTR(men$,",")
  940 IF i%=0 m$=men$:men$="" ELSE m$=LEFT$(men$,i%-1):men$=MID$(men$,i%+1)
  950 IF LEFT$(m$,1)="#" THEN m$=FNyn(VALMID$(m$,2))+MID$(m$,3) ELSE m$="  "+m$
  960 m$(items%)=m$
  970 items%=items%+1
  980 UNTIL men$=""
  990 VDU 28,0,24,39,3,12
 1000 PROCstatus(stat$)
 1010 PROCc("Cursor keys move pointer",16)
 1020 PROCc("RETURN selects",18)
 1030 REPEAT
 1040 VDU 30
 1050 FOR i%=0 TO items%-1
 1060 IF choice%=i% VDU 135 ELSE VDU 130
 1070 PRINT SPC5;m$(i%)
 1080 NEXT
 1090 key%=GET
 1100 IF key%=138 choice%=(choice%+1) MOD items%
 1110 IF key%=139 choice%=(choice%+items%-1) MOD items%
 1120 UNTIL key%=13
 1130 =choice%
 1140 :
 1150 DEF PROCtitle(t$)
 1160 FOR i%=0 TO 1
 1170 PRINTTAB(0,i%)SPC40
 1180 PRINTTAB(0,i%)CHR$131CHR$141SPC(18-LEN(t$)/2)t$
 1190 NEXT
 1200 ENDPROC
 1210 :
 1220 DEF PROCc(t$,y%)
 1230 PRINTTAB(20-LEN(t$)/2,y%)t$;
 1240 ENDPROC
 1250 :
 1260 DEF PROCbiggest(d$,tofind%)
 1270 CLS
 1280 tpos%=0
 1290 PROCstatus("Searching...")
 1300 found%=0
 1310 list%=-1
 1320 PROCshowlist
 1330 z%=FNsearch(d$,0,FALSE)
 1340 PROCstatus("Search complete")
 1350 ENDPROC
 1360 :
 1370 DEF FNsearch(f$,depth%,dirflag%)
 1380 LOCAL i%,f%,done%,dirsize%
 1390 IF depth%>1 AND NOT (recur% OR which%=1) THEN =0
 1400 f%=FNtype(f$)
 1410 IF f%=1 THEN =FNfile(f$)
 1420 dirsize%=0
 1430 IF depth%=1 AND which%=1 dirflag%=TRUE
 1440 PROCseldir(f$)
 1450 i%=0
 1460 REPEAT
 1470 PROCgbpb(0,temp%,1,i%)
 1480 done%=(q%!5<>0)
 1490 IF NOT done% dirsize%=dirsize%+FNsearch(f$+"."+FNstring(temp%),depth%+1,dirflag%):PROCseldir(f$):i%=i%+1
 1500 UNTIL done%
 1510 IF depth%=1 AND which%=1 PROCinsert(0,0,dirsize%,-2,f$)
 1520 =dirsize%
 1530 :
 1540 DEF PROCseldir(d$)
 1550 PROCstatus("*DIR "+FNfname(d$,34))
 1560 OSCLI("DIR "+d$)
 1570 ENDPROC
 1580 :
 1590 DEF PROCstatus(t$)
 1600 PRINTTAB(0,21)t$;SPC(39-LEN(t$));
 1610 ENDPROC
 1620 :
 1630 DEF FNstring(s%)
 1640 LOCAL p%,done%
 1650 p%=s%+1+?s%
 1660 s%=s%+1
 1670 REPEAT
 1680 done%=TRUE
 1690 IF p%>s%:IF ?(p%-1)=32 p%=p%-1:done%=FALSE
 1700 UNTIL done%
 1710 ?p%=13
 1720 =$s%
```

```
1730 :
1740 DEF FNfile(f$)
1750 LOCAL load%,exec%,size%,i%,j%,k%,ft%
1760 load%=q%!2
1770 exec%=q%!6
1780 size%=q%!10
1790 IF dirflag% THEN =size%
1800 ft%=FNvalidfile(load% AND &FFFF,exec% AND &FFFF,size%)
1810 IF ft%=-3 THEN =-size%
1820 PROCinsert(load%,exec%,size%,ft%,f$)
1830 =size%
1840 :
1850 DEF PROCinsert(load%,exec%,size%,ft%,f$)
1860 IF found%=0 PROCaddfile(found%,load%,exec%,size%,ft%,f$):list%=found%:next%(list%)=-1:found%=1:PROCshowlist:ENDPROC
1870 i%=list%
1880 j%=-1
1890 REPEAT
1900 IF size%>!(FNa(i%)+8) THEN j%=i%:i%=next%(i%)
1910 UNTIL i%=-1 OR size%<=!(FNa(i%)+8)
1920 IF j%=-1 AND found%=tofind% ENDPROC
1930 IF j%=-1 PROCaddfile(found%,load%,exec%,size%,ft%,f$):next%(found%)=list%:list%=found%:found%=found%+1:PROCshowlist:ENDPROC
1940 IF found%=tofind% AND j%=list% PROCaddfile(list%,load%,exec%,size%,ft%,f$):PROCshowlist:ENDPROC
1950 IF found%=tofind% k%=list%:list%=next%(list%) ELSE k%=found%:found%=found%+1
1960 PROCaddfile(k%,load%,exec%,size%,ft%,f$)
1970 next%(j%)=k%
1980 next%(k%)=i%
1990 PROCshowlist
2000 ENDPROC
2010 :
2020 DEF PROCshowlist
2030 VDU 30
2040 IF list%=-1 PRINTSPC3"None found yet...":ENDPROC
2050 IF verbose% PROCvlist ELSE PROCclist
2060 ENDPROC
2070 :
2080 DEF PROCclist
2090 LOCAL i%,a%,v%
2100 v%=found%-1
2110 i%=list%
2120 REPEAT
2130 a%=FNa(i%)
2140 PRINTTAB(0,v%);RIGHT$("       "+STR$(a%!8),7);
2150 PRINT"  "$(FNa(i%)+16)
2160 i%=next%(i%)
2170 v%=v%-1
2180 UNTIL i%=-1
2190 ENDPROC
2200 :
2210 DEF PROCvlist
2220 LOCAL i%,a%,v%,ft%
2230 v%=found%-1
2240 i%=list%
2250 REPEAT
2260 a%=FNa(i%)
2270 PRINTTAB(0,v%*4)$(FNa(i%)+16)
2280 ft%=!(FNa(i%)+12)
2290 IF ft%<>-2 PRINT FNhex(!a%);" ";FNhex(a%!4);"  ";
2300 PRINT RIGHT$(STRING$(10," ")+FNsize(a%!8),10);"  ";FNtypestring(ft%)
2310 i%=next%(i%)
2320 v%=v%-1
2330 UNTIL i%=-1
2340 ENDPROC
2350 :
2360 DEF FNsize(s%)
2370 IF s%>&1000 THEN =STR$(s% DIV &400)+"K"
2380 =STR$(s%)+" bytes"
2390 :
2400 DEF FNfname(f$,l%)
2410 IF LEN(f$)<=l% THEN =LEFT$(f$+STRING$(l%," "),l%)
2420 ="..."+RIGHT$(f$,l%-3)
2430 :
2440 DEF PROCaddfile(i%,load%,exec%,size%,ft%,f$)
2450 LOCAL a%
2460 a%=FNa(i%)
2470 !a%=load%
2480 a%!4=exec%
2490 a%!8=size%
2500 a%!12=ft%
2510 $(a%+16)=FNfname(f$,30-36*verbose%)
2520 ENDPROC
2530 :
2540 DEF FNa(n%)
2550 =filedat%+fdatsize%*n%
2560 :
2570 DEF PROCgbpb(handle%,data%,bytes%,pointer%)
2580 ?q%=handle%
2590 q%!1=data%
2600 q%!5=bytes%
2610 q%!9=pointer%
2620 z%=FNcall(&FFD1,q%,8)
2630 ENDPROC
2640 :
2650 DEF FNtype(f$)
2660 =FNosfile(5,f$)
2670 :
2680 DEF FNosfile(A%,f$)
2690 $temp%=f$
2700 !q%=temp%
2710 =FNcall(&FFDD,q%,A%)
2720 :
2730 DEF FNcall(r%,q%,A%)
2740 X%=q% MOD 256
2750 Y%=q% DIV 256
2760 =USR(r%) AND &FF
2770 :
2780 DEF FNhex(n%)
2790 =RIGHT$("00000000"+STR$~n%,8)
2800 :
2810 DEF PROCerror(err$)
2820 PRINTerr$
2830 ENDPROC
2840 :
2850 DEF FNvalidfile(load%,exec%,size%)
2860 LOCAL i%,valid%
2870 IF which%=0 THEN =-1
2880 i%=0
2890 REPEAT
2900 IF sel%(i%) valid%=EVAL("FN"+func$(i%)+"(load%,exec%,size%)") ELSE valid%=FALSE
2910 IF NOT valid% i%=i%+1
2920 UNTIL valid% OR (i%=func%)
2930 IF NOT valid% i%=-3
2940 =i%
2950 :
2960 DEF FNScreen(load%,exec%,size%)
2970 =(load%=&3000 AND size%=&5000) OR (load%=&5800 AND size%=&2800)
2980 :
2990 DEF FNTeletext(load%,exec%,size%)
3000 =(load%=&7C00)
3010 :
3020 DEF FNExec(load%,exec%,size%)
3030 =(load%=0 AND exec%=&FFFF)
3040 :
3050 DEF FNRom(load%,exec%,size%)
3060 =(load%=&8000)
3070 :
3080 DEF FNBasic(load%,exec%,size%)
3090 =(load% AND &FF)=0 AND load%>=&800 AND load%<&2000 AND (exec%=load% OR exec%>&8000)
3100 :
3110 DEF FNFKeys(load%,exec%,size%)
3120 =(load%=&B00 AND size%<=&100)
3130 :
3140 DEF FNFont(load%,exec%,size%)
3150 =(load%=&C00 AND size%<=&100)
3160 :
3170 DEF FNtypestring(t%)
3180 IF t%=-2 THEN ="Directory"
3190 IF t%=-1 THEN ="File"
3200 =type$(t%)
3210 :
3220 DATA Screen,Teletext
3230 DATA Exec,Rom,Basic
3240 DATA FKeys,Font
3250 DATA Other
```

Listing 7

```
  10 REM >LdPicARM (Info4a)
  20 REM By Dave Lawrence
  30 REM For Archimedes only
  40 REM (c) BAU Sep 91
  50 :
  60 PROCinit
  70 PROCcode
  80 SYS "OS_File",10,"%.LdPic",&FFC,,code,P%
  90 END
 100 :
 110 DEF PROCinit
 120 DIM code 2000
 130 himem=4
 140 count=5
 150 countbits=6
 160 bitsreq=7
 170 step=8
 180 passcount=9
 190 screen=10
 200 bits=11
 210 ws=12
 220 sp=13
 230 link=14
 240 pc=15
 250 ENDPROC
 260 :
 270 DEF PROCcode
 280 FOR pass%=0 TO 2 STEP 2
 290 P%=code
 300 [OPT pass%
 310 STMFD   (sp)!,{link}
 320 STR     sp,stack
 330 MOV     R2,ws
 340 LDRB    R0,[R1]
 350 CMP     R0,#32
 360 BGE     copyname
 370 LDMFD   (sp)!,{link}
 380 ADR     R0,synerr
 390 ORRS    pc,link,#1<<28
 400 .synerr EQUD    16
 410 EQUS    "Syntax: *LdPic <SvPic Screen>"+CHR$0
 420 ALIGN
 430 :
 440 .copyname
 450 LDRB    R0,[R1],#1
 460 STRB    R0,[R2],#1
 470 CMP     R0,#32
 480 BGE     copyname
 490 MOV     R0,#&40
 500 MOV     R1,ws
 510 MOV     R2,#0
 520 SWI     "XOS_Find"
 530 LDMVSFD (sp)!,{pc}
 540 CMP     R0,#0
 550 BNE     okhandle
 560 MOV     R0,#19
 570 MOV     R1,ws
 580 MOV     R2,#0
 590 SWI     "XOS_File"
 600 LDMFD   (sp)!,{pc}
 610 .okhandle
 620 STR     R0,handle
 630 MOV     bits,#1
 640 MOV     R2,#8
 650 BL      multiread
 660 MOV     bitsreq,R0
 670 MOV     R2,#8
 680 BL      multiread
 690 STR     R0,mode
 700 CMP     R0,#7
 710 BLT     realmode
 720 LDMFD   (sp)!,{link}
 730 ADR     R0,nastymode
 740 ORRS    pc,link,#1<<28
 750 .nastymode
 760 EQUD    25
 770 EQUS    "Unusable mode"+CHR$0
 780 ALIGN
 790 :
 800 .realmode
 810 ADR     R1,msizes
 820 LDR     himem,[R1,R0,ASL #2]
 830 SWI     &100+22
 840 SWI     &100+12
 850 SWI     "XOS_RemoveCursors"
 860 ADR     R0,scr%
 870 ADR     R1,scr%
 880 SWI     "XOS_ReadVduVariables"
 890 MOV     R1,#15
 900 .palloop
 910 SWI     &100+19
 920 MOV     R0,R1
 930 SWI     "OS_WriteC"
 940 MOV     R2,#4
 950 BL      multiread
 960 SWI     "OS_WriteC"
 970 SWI     &100+0
 980 SWI     &100+0
 990 SWI     &100+0
1000 SUBS    R1,R1,#1
1010 BPL     palloop
1020 MOV     R2,#8
1030 BL      multiread
1040 MOV     step,R0
1050 MOV     R2,#8
1060 BL      multiread
1070 MOV     countbits,R0
1080 MOV     passcount,step
1090 .screenpass
1100 MOV     screen,passcount
1110 SUB     screen,screen,#1
1120 STR     screen,scrl
1130 MOV     R0,#0
1140 STR     R0,scrx
1150 STR     R0,scry
1160 .getbit MOV     R2,#1
1170 BL      multiread
1180 CMP     R0,#0
1190 BEQ     single
1200 MOV     R2,countbits
1210 BL      multiread
1220 MOV     count,R0
1230 MOV     R2,bitsreq
1240 BL      multiread
1250 .repeat BL      writeR0
1260 BL      updatescr
1270 SUBS    count,count,#1
1280 BNE     repeat
1290 B       until
1300 .single MOV     R2,bitsreq
1310 BL      multiread
1320 BL      writeR0
1330 BL      updatescr
1340 .until  CMP     screen,himem
1350 BLT     getbit
1360 SUBS    passcount,passcount,#1
1370 BNE     screenpass
1380 MOV     R0,#0
1390 LDR     R1,handle
1400 SWI     "XOS_Find"
1410 LDMFD   (sp)!,{pc}
1420 :
1430 .updatescr
1440 STMFD   (sp)!,{R0-R4,link}
1450 ADD     screen,screen,step
1460 LDR     R0,mode
1470 CMP     R0,#4
1480 MOVLT   R4,#1
1490 MOVGE   R4,#2
1500 ADR     R3,scrinfo
1510 LDMIA   (3),{R0,R1,R2}
1520 ADD     R2,R2,step
1530 CMP     R2,#8
1540 SUBGE   R2,R2,#8
1550 ADDGE   R0,R0,R4
1560 CMPGE   R0,#80
1570 SUBGE   R0,R0,#80
1580 ADDGE   R1,R1,#1
1590 STMIA   (3),{R0,R1,R2}
1600 LDMFD   (sp)!,{R0-R4,pc}
1610 :
1620 .writeR0
1630 STMFD   (sp)!,{R1-R4,link}
1640 LDR     R1,scrl
1650 LDR     R2,scry
1660 ADD     R1,R1,R2,ASL #3
1670 LDR     R2,scr%
1680 ADD     R2,R2,R1,ASL #6
1690 ADD     R2,R2,R1,ASL #8
1700 LDR     R1,scrx
1710 ADD     R2,R2,R1,ASL #2
1720 LDR     R1,mode
1730 ADD     pc,pc,R1,ASL #2
1740 EQUD    0
1750 B       mode0
1760 B       mode1
1770 B       mode2
1780 B       mode0
1790 B       mode4
1800 B       mode1
1810 B       mode4
1820 :
1830 .mode0  MOV     R4,#&40
1840 .mode0loop
1850 MOV     R3,#0
1860 TST     R0,R4,ASL #1
1870 ORRNE   R3,R3,#1
1880 TST     R0,R4
1890 ORRNE   R3,R3,#&10
1900 STRB    R3,[R2],#1
1910 MOVS    R4,R4,LSR #2
1920 BNE     mode0loop
1930 LDMFD   (sp)!,{R1-R4,pc}
1940 :
1950 .mode1  MOV     R4,#&08
1960 .mode1loop
1970 MOV     R3,#0
1980 TST     R0,R4,LSL #4
1990 ORRNE   R3,R3,#&22
2000 TST     R0,R4
2010 ORRNE   R3,R3,#&11
2020 STRB    R3,[R2],#1
2030 CMP     R1,#5
2040 STREQB  R3,[R2],#1
2050 MOVS    R4,R4,LSR #1
2060 BNE     mode1loop
2070 LDMFD   (sp)!,{R1-R4,pc}
2080 :
2090 .mode2  MOV     R4,#2
2100 .mode2loop
2110 MOV     R3,#0
2120 TST     R0,R4,LSL #6
2130 ORRNE   R3,R3,#&88
2140 TST     R0,R4,LSL #4
2150 ORRNE   R3,R3,#&44
2160 TST     R0,R4,LSL #2
2170 ORRNE   R3,R3,#&22
2180 TST     R0,R4,LSL #0
2190 ORRNE   R3,R3,#&11
2200 STRB    R3,[R2],#1
2210 STRB    R3,[R2],#1
2220 MOVS    R4,R4,LSR #1
2230 BNE     mode2loop
2240 LDMFD   (sp)!,{R1-R4,pc}
2250 :
2260 .mode4  MOV     R4,#&80
2270 .mode4loop
2280 MOV     R3,#0
2290 TST     R0,R4
2300 ORRNE   R3,R3,#&11
2310 STRB    R3,[R2],#1
2320 MOVS    R4,R4,LSR #1
2330 BNE     mode4loop
2340 LDMFD   (sp)!,{R1-R4,pc}
2350 :
2360 .multiread
2370 STMFD   (sp)!,{R1,R3,R4,link}
2380 MOV     R3,#0
2390 MOV     R4,R2
2400 LDR     R0,fbyte
2410 .mrloop SUBS    bits,bits,#1
2420 BNE     gotsomebits
2430 LDR     R1,handle
2440 SWI     "XOS_BGet"
2450 LDRVS   sp,stack
2460 LDMVSFD (sp)!,{pc}
2470 MOV     bits,#8
2480 MOV     R0,R0,ASL #24
2490 .gotsomebits
2500 MOVS    R0,R0,LSL #1
2510 MOV     R3,R3,RRX
2520 SUBS    R4,R4,#1
2530 BNE     mrloop
2540 STR     R0,fbyte
2550 RSB     R2,R2,#32
2560 MOV     R0,R3,LSR R2
2570 LDMFD   (sp)!,{R1,R3,R4,pc}
2580 :
2590 .msizes EQUD    &5000
2600 EQUD    &5000
2610 EQUD    &5000
2620 EQUD    &4000
2630 EQUD    &2800
2640 EQUD    &2800
2650 EQUD    &2000
```




```
2660 EQUD    0
2670 :
2680 .scr%   EQUD    148
2690 EQUD    -1
2700 .stack  EQUD    0
2710 .handle EQUD    0
2720 .fbyte  EQUD    0
2730 .mode   EQUD    0
2740 .scrinfo
2750 .scrx   EQUD    0
2760 .scry   EQUD    0
2770 .scrl   EQUD    0
2780 ]
2790 NEXT
2800 ENDPROC
```

Listing 8

```
10 REM >Wave (Info5a)
20 REM by J S Graley
30 REM for Archimedes only
40 REM (c) BAU Sep 91
50 :
60 MODE 12
70 colsh=4
80 xres=640:xmul=2
90 yres=256:ymul=4
100 height=70
110 width=152
120 skipsh=1
130 repsh=0
140 colour=4
150 DIM memory 20000
160 DIM voice(31)
170 DIM newfill(31),newgoff(31)
180 DIM oldfill(31),oldgoff(31)
190 SYS "Sound_Configure",1,416,48 TO D%,D%,D%,level1
200 VOICES 8
210 FOR pass=0 TO 2 STEP 2
220 P%=memory
230 [OPT pass
240 .plot
250 LDR     R12,temp
260 LDR     R7,temp+4
270 STR     R0,temp
280 ADR     R6,data
290 ADD     R6,R6,#1024
300 ADD     R6,R6,R7,ASL #11
310 LDMIA   R6!,{R0-R3}
320 MOV     R11,R11,ASL #skipsh
330 MLA     R4,R11,R3,R12
340 MOV     R9,R1,ASL R2
350 LDR     R7,temp
360 CMP     R7,#&02
370 BLE     flush
380 ADR     R7,data
390 .plotloop
400 LDRB    R3,[R12],R11
410 LDR     R3,[R7,R3,ASL #2]
420 SUB     R8,R0,R3
430 LDR     R2,[R6]
440 LDR     R3,[R2]
450 EOR     R3,R3,R9
460 STR     R3,[R2]
470 LDR     R3,[R8]
480 EOR     R3,R3,R9
490 STR     R3,[R8]
500 STR     R8,[R6],#4
510 LDRB    R3,[R12],R11
520 LDR     R3,[R7,R3,ASL #2]
530 SUB     R8,R0,R3
540 LDR     R2,[R6]
550 LDR     R3,[R2]
560 EOR     R3,R3,R9,ROR #32-(colsh<<repsh)
570 STR     R3,[R2]
580 LDR     R3,[R8]
590 EOR     R3,R3,R9,ROR #32-(colsh<<repsh)
600 STR     R3,[R8]
610 STR     R8,[R6],#4
620 MOV     R9,R9,ROR #32-(colsh<<repsh)*2
630 TST     R9,#(1<<colsh)-1
640 ADDNE   R0,R0,#4
650 CMP     R12,R4
660 BLT     plotloop
670 LDR     R0,temp
680 LDMFD   R13!,{PC}
690 .flush
700 LDR     R8,[R6]
710 LDR     R3,[R8]
720 EOR     R3,R3,R9
730 STR     R3,[R8]
740 ADR     R8,dump
750 STR     R8,[R6],#4
760 MOV     R9,R9,ROR #32-(colsh<<repsh)
770 ADD     R12,R12,R11
780 CMP     R12,R4
790 BLT     flush
800 MOV     R0,R7
810 LDMFD   R13!,{PC}
820 ]
830 FOR H%=0 TO 31
840 voice(H%)=!(level1+&40+H%*4)
850 IF voice(H%)<>0 THEN
860 oldfill(H%)=voice(H%)+(!voice(H%) AND &FFFFFF)*4+8
870 [OPT pass
880 .newfill(H%)
890 STR     R12,temp
900 STR     R7,temp+4
910 ADR     R0,ind
920 STMFD   R13!,{R0}
930 B       oldfill(H%)
940 ]
950 ENDIF
960 NEXT H%
970 [OPT pass
980 .ind
990 B       plot
1000 ]
1010 FOR H%=0 TO 31
1020 IF voice(H%)<>0 THEN
1030 oldgoff(H%)=voice(H%)+12+(voice(H%)!12 AND &FFFFFF)*4+8
1040 [OPT pass
1050 .newgoff(H%)
1060 STR     R12,temp
1070 STR     R7,temp+4
1080 ADR     R0,ind
1090 STMFD   R13!,{R0}
1100 B       oldgoff(H%)
1110 ]
1120 ENDIF
1130 NEXT H%
1140 [OPT pass
1150 .scr
1160 EQUD    148
1170 EQUD    -1
1180 .temp
1190 EQUD    0
1200 EQUD    0
1210 .dump
1220 EQUD    0
1230 .data
1240 ]
1250 NEXT pass
1260 FOR N%=0 TO 255
1270 P%!(N%*4)=(((FNlin(N%)>>16)+32768)*height>>16)*colsh*xres/8
1280 NEXT N%
1290 SYS "OS_ReadVduVariables",scr,scr
1300 screen=!scr
1310 COLOUR 1,192,0,32
1320 COLOUR 2,128,240,0
1330 COLOUR 6,128,240,0
1340 FOR N%=0 TO 3
1350 COLOUR N%+8,0,16,48+16*N%
1360 COLOUR N%+12,240,0,64
1370 NEXT N%
1380 VDU 28,0,31,79,20
1390 FOR C%=1 TO 8
1400 READ X%,Y%,S%
1410 FOR N%=0 TO 3
1420 GCOL 11-N%
1430 RECTANGLE FILL X%*xmul,(yres+height*N%/8-Y%-1)*ymul,width*xmul,height*ymul*(1-N%/4)
1440 NEXT N%
1450 VDU 5:GCOL 2
1460 MOVE (X%+5)*xmul,(yres-Y%+9)*ymul
1470 PRINT"ch.";C%;
1480 VDU 4:GCOL 1
1490 RECTANGLE X%*xmul,(yres-Y%-1)*ymul,width*xmul,height*ymul
1500 cw=data+1024+2048*(C%-1)
1510 FOR N%=0 TO 2044 STEP 4
1520 cw!N%=dump
1530 NEXT N%
1540 cw!0=screen+colsh*(xres*Y%+X%)/8
1550 cw!4=colour*((1<<colsh)^(1<<repsh)-1)/((1<<colsh)-1)
1560 cw!8=(colsh*X%) MOD 32
1570 cw!12=width>>repsh
1580 OSCLI "CHANNELVOICE "+STR$C%+" "+STR$C%
1590 STEREO C%,S%
1600 NEXT C%
1610 FOR H%=0 TO 31
1620 IF voice(H%)<>0 THEN
1630 P%=voice(H%)
1640 [OPT 2:B newfill(H%):]
1650 P%=voice(H%)+12
1660 [OPT 2:B newgoff(H%):]
1670 ENDIF
1680 NEXT H%
1690 C%=0
1700 *FX 225,2
1710 *FX 229,1
1720 OFF
1730 pitcha$=" ZzSsXxDdCcVvGgBbHhNnJjMm<,Ll>.:;?/""'"
1740 pitchb$=" qQ2@wW3#eErR5%tT6^yY7&uUiI9(oO0)pP[{=+]}£¤\|"
1750 channel%=1
1760 PRINT"f1-f8 selects channel, ESCAPE quits, TAB flushes channel"
1770 PRINT"Other keys play notes"
1780 PRINT"f9 exits to 'shell' - use with care!"'
1790 REPEAT
1800 PRINTTAB(0,4)"Channel: ";channel%
1810 i%=INKEY(0)
1820 IF i%=0 i%=256+GET
1830 IF i%=9 OSCLI "CHANNELVOICE "+STR$channel%+" 0":OSCLI "CHANNELVOICE "+STR$channel%+" "+STR$channel%
1850 IF i%>=&181 AND i%<=&188 THEN
1860 channel%=i%-&180
1870 ELSE
1880 p%=INSTR(pitcha$,CHR$i%) DIV 2
1890 IF p%=0 THEN
1900 p%=INSTR(pitchb$,CHR$i%) DIV 2
1910 IF p%>0 p%+=12
1920 ENDIF
1930 IF p%>0 THEN
1940 SOUND channel%,&17F,53+4*p%,-1
1950 ENDIF
1960 ENDIF
1970 UNTIL i%=27 OR i%=&189
1980 *FX 225,1
1990 *FX 229
2000 IF i%=&189 THEN CLS:PROCins("PAGE="+STR$(END+256)):PROCins("NEW"):END
2010 FOR H%=0 TO 31
2020 IF voice(H%)<>0 THEN
2030 P%=voice(H%)
2040 [OPT 2:B oldfill(H%):]
2050 P%=voice(H%)+12
2060 [OPT 2:B oldgoff(H%):]
2070 ENDIF
2080 NEXT H%
2090 END
2100 :
2110 DEF PROCins(i$)
2120 FOR i%=1 TO LEN(i$)
2130 SYS "OS_Byte",138,0,ASCMID$(i$,i%)
2140 NEXT
2150 SYS "OS_Byte",138,0,13
2160 ENDPROC
2170 :
2180 DEF FNlin(L%)
2190 neg=-(L% AND 1)
2200 L%=(L% AND NOT 1)
2210 E%=&3FFFFFFF
2220 J%=&40000000
2230 J%=J%/2
2240 SYS"Sound_SoundLog",E% TO R%
2250 IF R%>L% THEN E%-=J%:GOTO 2230
2260 IF R%<L% THEN E%+=J%:GOTO 2230
2270 IF neg THEN =-E% ELSE =E%
2280 :
2290 DATA 0,83,-120
2300 DATA 160,83,-40
2310 DATA 320,83,40
2320 DATA 480,83,120
2330 DATA 0,158,-120
2340 DATA 160,158,-40
2350 DATA 320,158,40
2360 DATA 480,158,120
```

Listing 9

```
10 REM >FontBoxes (Info6a)
20 REM By Dave Lawrence
30 REM For Archimedes only
40 REM (c) BAU September 1991
50 :
60 MODE 12:OFF
70 font$="Corpus.Medium"
80 size%=50
90 SYS "Font_FindFont",,font$,size%*16,size%*16,0,0 TO handle
100 SYS "Font_SetFont",handle
110 SYS "Font_SetPalette",,8,15,-7,0,&FFFFFF00
120 char=32
130 x=0
140 y=920
150 REPEAT
160 SYS "Font_SetFontColours",handle,8,15,-6
170 SYS "Font_Paint",,CHR$char,%00010000,x,y
180 SYS "Font_StringBBox",,CHR$char TO ,minx,miny,maxx,maxy
190 PROCrect(minx,miny,maxx,maxy,1)
200 SYS "Font_CharBBox",handle,char TO ,minx,miny,maxx,maxy
210 PROCrect(minx,miny,maxx,maxy,2)
220 x+=96
230 IF x>1200 x=0:y-=128
240 char+=1
250 UNTIL char=127
260 SYS "Font_LoseFont",handle
270 END
280 :
290 DEF PROCrect(x1,y1,x2,y2,c)
300 SYS "Font_ConverttoOS",,x1,y1 TO ,x1,y1
310 SYS "Font_ConverttoOS",,x2,y2 TO ,x2,y2
320 GCOL c
330 RECTANGLE x+x1,y+y1,x2-x1,y2-y1
340 ENDPROC
```

Listing 10

```
10 REM >LocalTest (Info7a)
20 REM by Dave Acton
30 REM for Archimedes only
40 REM (c) BAU Sep 91
50 :
60 DIM mem% &100
70 ?mem%=42
80 mem%!1=&12345
90 $(mem%+5)="Outside the procedure..."
100 PRINT $(mem%+5)
110 PRINT "?mem%=";?mem%
120 PRINT "mem%!1=&";~mem%!1
130 PROCedure(123,&ABCDE,"Inside the procedure")
140 PRINT $(mem%+5)
150 PRINT "?mem%=";?mem%
160 PRINT "mem%!1=&";~mem%!1
170 END
180 :
190 DEF PROCedure(?mem%,mem%!1,$(mem%+5))
200 PRINT $(mem%+5)
210 PRINT "?mem%=";?mem%
220 PRINT "mem%!1=&";~mem%!1
230 ENDPROC
```

Listing 11

```
10 MODE1:VDU23;8202;0;0;0;:DIMy(63):FORy=0TO63:y(y)=y*16:NEXT:FORx=0TO319:c=0:FORy=1TO62:GCOL0,c+1:PLOT69,x*4,y(y):c=(c+1)MOD3:NEXT:FORy=1TO62:REPEAT:z=y(y)+16-RND(32):UNTILz>y(y-1)ANDz<y(y+1):y(y)=z:NEXT:NEXT
```

Listing 12

```
10 MODE1:VDU23;8202;0;0;0;:DIMsin(129):c=0:h%=0:FORf%=0TO129:sin(f%)=50*SIN(c):c=c+0.3:NEXT:CLS:FORx%=-50TO1320STEP24:MOVEx%,1024:c%=0:GCOL0,h%+1:h%=(h%+1)MOD3:FORy%=1024TO0STEP-8:DRAWx%+sin(c%),y%:c%=c%+1:NEXT:NEXT:IFGET
```

Listing 13

```
10 MODE12:OFF:DIMx(8),y(8):r=35:s=1:t=2:REPEATMOUSEx(1),y(1),b:WAIT:SYS6,113,s:SYS6,112,t:SWAPs,t:CLS:CIRCLEx(1),y(1),r:FORi=2TO8:GCOLi-1:x=x(i-1)-x(i):y=y(i-1)-y(i):d=SQR(x*x+y*y)+.1:p=(d-r-r)/d:x(i)+=x*p:y(i)+=y*p:CIRCLEFILLx(i),y(i),r:LINEx(i-1),y(i-1),x(i),y(i):NEXT:IFb=4r-=1:UNTIL0ELSEIFb=1r+=1:UNTIL0ELSEUNTIL0
```

Juggling

Listing 1

```
10 REM >MakeJugSpr (Juggle1)
20 REM by Nick Craig-Wood
30 REM for Arc only
40 REM (c) BAU Sep 91
50 :
60 MODE 13
70 OFF
80 :
90 spriteareasize=8*1024
100 spriteop=&2E
110 DIM spritearea spriteareasize
120 spritearea!0=spriteareasize
130 spritearea!8=16
140 SYS spriteop,9+256,spritearea
150 :
160 RESTORE
170 DATA %110000,%001100,%000011,%110010,%101100,%001011,%101111
180 DATA %100100,%011000
190 :
200 FOR i%=1 TO 9
210 CLS
220 READ c%
230 GCOL c% TINT 255
240 CIRCLE FILL 4*8,4*8,4*8
250 MOVE 0,0: MOVE 4*16,4*16
260 SYS spriteop,14+256,spritearea,"ball"+STR$(i%),0
270 SYS spriteop,29+256,spritearea,"ball"+STR$(i%),0
280 NEXT i%
290 CLS
300 :
310 PRINT "Calculating masks"
320 SYS spriteop,40+256,spritearea,"ball1"  TO ,,,mx%,my%
330 FOR x%=0 TO mx%-1
340 FOR y%=0 TO my%-1
350 SYS spriteop,41+256,spritearea,"ball1",x%,y%  TO ,,,,,a%
360 IF a%<>0 THEN a%=1
370 FOR i%=1 TO 9
380 SYS spriteop,44+256,spritearea,"ball"+STR$(i%),x%,y%,a%
```

```
390 NEXT i%
400 NEXT y%
410 NEXT x%
420 :
430 FOR i%=1 TO 9
440 SYS spriteop,34+256,spritearea,"ball"+STR$(i%),i%*80,i%*80,8
450 NEXT i%
460 :
470 PRINT "Saving JugSprites"
480 SYS spriteop,12+256,spritearea,"JugSprites"
490 END
```

Listing 2

```
10 REM Juggling (Juggle2)
20 REM by Nick Craig-Wood
30 REM for Arc Only
40 REM (c) BAU Sep91
50 :
60 REM starting hand is right hand = 0
70 :
80 MODE 15:MODE 13:OFF
90 screeny%=1024:screenx%=1280
100 PROCresetbanks
110 ON ERROR PROCerror
120 :
130 bally%=screeny%/40
140 ballx%=bally%
150 rhand%=ballx%*4
160 lx%=0.25*screenx%
170 rx%=0.75*screenx%
180 lx0%=lx%+rhand%
190 lx1%=lx%-rhand%
200 rx0%=rx%-rhand%
210 rx1%=rx%+rhand%
220 :
230 midx%=0.5*screenx%
240 chesty%=0.7*screeny%
250 shoulderx%=0.15*screenx%
260 shouldery%=0.65*screeny%
270 elbowx%=0.25*screenx%
280 elbowy%=0.37*screeny%
290 headd%=0.12*screeny%
300 heady%=screeny%-headd%
310 bottomy%=0
320 heighty%=0.8*screeny%
330 basey%=rhand%+bally%
340 :
350 rtick%=32
360 tickspeed%=2
370 nmax%=250
380 DIM pattern%(nmax%)    :REM pattern
390 DIM height%(9)         :REM height of throw
400 DIM ticks%(9)          :REM current position of throw
410 DIM hands%(9)          :REM starting hand
420 DIM pos%(9)            :REM position in pattern ball was thrown
430 :
440 DIM trackx%(9,rtick%*9)
450 DIM tracky%(9,rtick%*9)
460 DIM handx%(1,2*rtick%)
470 DIM handy%(1,2*rtick%)
480 r2%=2*rtick%
490 :
500 SpriteAreaSize=8*1024
510 DIM SpriteArea SpriteAreaSize
520 DIM sprite%(9)
530 SpriteArea!0=SpriteAreaSize
540 SpriteArea!8=16
550 SpriteOp=&2E
560 SYS SpriteOp,9+256,SpriteArea
570 SYS SpriteOp,10+256,SpriteArea,"JugSprites"
580 FOR i%=1 TO 9
590 SYS SpriteOp,24+256,SpriteArea,"ball"+STR$(i%) TO ,,sprite%(i%-1)
600 NEXT i%
610 :
620 REM possible attributes
630 :
640 REPEAT
650 PROCgetpattern
660 PRINT "Computing throws ... ";
670 PROCtrack
680 PROCjuggle
690 UNTIL FALSE
700 END
710 :
720 DEF PROCgetpattern
730 PRINT TAB(0,1);
740 PRINT "Whilst the program is juggling"
750 PRINT "  + speeds it up"
760 PRINT "  - slows it down"
770 PRINT "and SPACE enters another pattern"
780 PRINT
790 prompt$="Enter Pattern (Q to Quit E for Examples)"
800 PRINT prompt$
810 ON
820 REPEAT
830 INPUT p$
840 ok=TRUE
850 IF LENp$>nmax% THEN PRINT "Pattern too big": ok=FALSE: p$="3"
860 plen%=0
870 FOR i%=1 TO LENp$
880 a$=MID$(p$,i%,1)
890 CASE a$ OF
900 WHEN "0","1","2","3","4","5","6","7","8","9":
910 pattern%(plen%)=ASCa$-ASC"0"
920 plen%+=1
930 WHEN "Q","q"
940 END
950 WHEN "E","e"
960 PROCshowexamples
970 PRINT prompt$
980 ok=FALSE
990 OTHERWISE
1000 PRINT "Unrecognised command: ";a$
1010 ok=FALSE
1020 ENDCASE
1030 ENDCASE
1040 NEXT i%
1050 :
1060 IF plen%=0 THEN
1070 pattern%(0)=3
1080 plen%=1
1090 ENDIF
1100 :
1110 IF (plen% AND 1) THEN
1120 IF 2*plen%>nmax% THEN
1130 PRINT "Pattern too big"
1140 ok=FALSE
1150 ELSE
1160 FOR i%=0 TO plen%-1
1170 pattern%(plen%+i%)=pattern%(i%)
1180 NEXT i%
1190 plen%=2*plen%
1200 ENDIF
1210 ENDIF
1220 :
1230 func=0
1240 WHILE func<>-1 AND ok
1250 func+=1
1260 CASE func OF
1270 WHEN 1: ok=FNgetsum
1280 WHEN 2: ok=FNgetav
1290 WHEN 3: ok=FNvalidpat
1300 OTHERWISE: func=-1
1310 ENDCASE
1320 ENDWHILE
1330 UNTIL ok
1340 IF max%>1 THEN
1350 yscale=heighty%/0.25/((max%-1)*(max%-1))
1360 ELSE
1370 yscale=heighty%
1380 ENDIF
1390 OFF
1400 ENDPROC
1410 :
1420 DEF PROCshowexamples
1430 CLS
1440 PRINT "Example patterns"
1450 PRINT
1460 PRINT "0 - 9 cascade 0 - 9 balls"
1470 PRINT "31,51,71,91 shower 2,3,4,5 balls"
1480 PRINT
1490 PRINT "How to learn to juggle 3 balls"
1500 PRINT "300, 3302, 2330, 330, 333"
1510 PRINT
1520 PRINT "How to learn to juggle 4 balls"
1530 PRINT "423, 40, 04, 4440, 441, 4"
1540 PRINT
1550 PRINT "How to learn to juggle 5 balls"
1560 PRINT "51, 15, 55500, 50505, 552, 55550, 5"
1570 PRINT
1580 PRINT "Some other interesting patterns"
1590 PRINT "423, 55500, 51, 531, 504, 612"
1600 PRINT "71, 53444, 53, 633, 552, 55550, 5551"
1610 PRINT "33333333345151515141"
1620 PRINT
1630 PRINT "Fun, but impossible"
1640 PRINT "123456789, 97531, 678, 747"
1650 PRINT
1660 ENDPROC
1670 :
1680 DEF FNgetsum
1690 ok=TRUE
1700 sum=0: max%=-1
1710 FOR i%=0 TO plen%-1
1720 a%=pattern%(i%)
1730 sum+=a%
1740 IF a%>max% THEN max%=a%
1750 NEXT i%
1760 =ok
1770 :
1780 DEF FNgetav
1790 ok=TRUE
1800 nb=sum/plen%
1810 IF nb-INT(nb)<>0 THEN
1820 PRINT "Pattern was for ";nb;" balls!"
1830 ok=FALSE
1840 ENDIF
1850 nball%=INT(nb)
1860 =ok
1870 :
1880 DEF FNvalidpat
1890 ok=TRUE
1900 IF plen%>1 THEN
1910 FOR i%=0 TO plen%-2
1920 FOR j%=i%+1 TO plen%-1
1930 IF pattern%(i%)+i%=pattern%(j%)+j% THEN ok=FALSE
1940 NEXT j%
1950 NEXT i%
1960 ENDIF
1970 IF NOT ok THEN
1980 PRINT "Pattern involved catching more than one ball at a time"
1990 ENDIF
2000 =ok
2010 :
2020 DEF PROCjuggle
2030 height%()=-1
2040 ticks%()=0
2050 p%=-1
2060 hand%=0
2070 :
2080 REPEAT
2090 dtick=1/rtick%
2100 REPEAT
2110 PROCtickjuggle
2120 hand%=1-hand%
2130 a$=INKEY$(0)
2140 UNTIL a$<>""
2150 :
2160 mego=FALSE
2170 REPEAT
2180 CASE a$ OF
2190 WHEN "+"
2200 tickspeed%=2*tickspeed%
2210 IF tickspeed%>rtick% THEN tickspeed%=rtick%
2220 WHEN "-"
2230 tickspeed%=tickspeed%/2
2240 IF tickspeed%<1 THEN tickspeed%=1
2250 WHEN " ": mego=TRUE
2260 WHEN "Q","q": END
2270 ENDCASE
2280 a$=INKEY$(0)
2290 UNTIL a$="" OR mego
2300 UNTIL mego
2310 ENDPROC
2320 :
2330 DEF PROCtickjuggle
2340 p%=(p%+1) MOD plen%
2350 h%=pattern%(p%)
2360 ticks%()=ticks%()+rtick%
2370 IF h%>0 THEN
2380 REM find out which ball has landed, and throw a new one if nec.
2390 b%=-1: c%=-1
2400 FOR i%=0 TO nball%-1
2410 IF ticks%(i%)>=rtick%*height%(i%) THEN
2420 IF height%(i%)>=0 THEN b%=i% ELSE c%=i%
2430 ENDIF
2440 NEXT i%
2450 IF b%=-1 THEN b%=c%
2460 IF b%<>-1 THEN
2470 height%(b%)=h%
2480 ticks%(b%)=0
2490 pos%(b%)=p%
2500 hands%(b%)=hand%
2510 ENDIF
2520 ENDIF
2530 :
2540 FOR ptick%=0 TO rtick%-1 STEP tickspeed%
2550 PROCstartupdate
2560 CLS
2570 PRINT p$
2580 :
2590 GCOL 63 TINT 255
2600 d%=rhand%/2
2610 t%=ptick%+rtick%*hand%
2620 LINE midx%-elbowx%,elbowy%, handx%(1,t%),handy%(1,t%)-d%/2
2630 LINE midx%+elbowx%,elbowy%, handx%(0,t%),handy%(0,t%)-d%/2
2640 LINE midx%-elbowx%,elbowy%, midx%-shoulderx%,shouldery%
2650 LINE midx%+elbowx%,elbowy%, midx%+shoulderx%,shouldery%
2660 LINE midx%-shoulderx%,shouldery%, midx%,chesty%
2670 LINE midx%+shoulderx%,shouldery%, midx%,chesty%
2680 LINE midx%,heady%-headd%, midx%,bottomy%
2690 CIRCLE midx%,heady%,headd%
2700 :
2710 FOR i%=0 TO nball%-1
2720 IF height%(i%)>=0 THEN
2730 t%=ticks%(i%)+ptick%
2740 h%=height%(i%)
2750 x%=trackx%(h%,t%)
2760 y%=tracky%(h%,t%)
2770 IF hands%(i%) THEN x%=screenx%-x%
2780 SYS SpriteOp,34+512,SpriteArea,sprite%(i%),x%-32,y%-16,8
2790 ENDIF
2800 NEXT i%
2810 :
2820 PROCendupdate
2830 NEXT ptick%
2840 ENDPROC
2850 :
2860 REM This makes the tracks for the hands and the balls
2870 :
2880 DEF PROCtrack
2890 REM first track the hands
2900 FOR ptick%=0 TO r2%-1
2910 t=PI*ptick%/rtick%
2920 handx%(0,ptick%)=rx%-rhand%*SIN(t)
2930 handy%(0,ptick%)=basey%-rhand%*COS(t)
2940 handx%(1,ptick%)=lx%-rhand%*SIN(t)
2950 handy%(1,ptick%)=basey%+rhand%*COS(t)
2960 NEXT ptick%
2970 :
2980 REM now make each ball track
2990 :
3000 FOR p%=1 TO 9
3010 IF INSTR(p$,STR$(p%)) THEN
3020 PRINT ;p%;
3030 sh%=0
3040 h%=p%
3050 IF (h% AND 1) THEN fh%=1-sh% ELSE fh%=sh%
3060 :
3070 REM This makes the tracks for throw from sh% to fh%, height h%
3080 REM In position p%
3090 :
3100 IF h%>1 THEN
3110 k0%=rtick%/2
3120 k1%=(h%*rtick%-rtick%/2) MOD r2%
3130 ELSE
3140 k0%=0
3150 k1%=rtick%
3160 ENDIF
3170 sx%=handx%(sh%,k0%): sy%=handy%(sh%,k0%)
3180 fx%=handx%(fh%,k1%): fy%=handy%(fh%,k1%)
3190 :
3200 CASE h% OF
3210 :
3220 WHEN 3,4,5,6,7,8,9:
3230 FOR ptick%=0 TO h%*rtick%-1
3240 ti=ptick%/rtick%
3250 q%=ptick% MOD r2%
3260 IF ti<0.5 THEN
3270 x%=handx%(sh%,q%)
3280 y%=handy%(sh%,q%)
3290 ELSE
3300 IF ti>h%-0.5 THEN
3310 x%=handx%(fh%,q%)
3320 y%=handy%(fh%,q%)
3330 ELSE
3340 t=(ti-0.5)/(h%-1)
3350 y%=(fy%-sy%)*t+sy%+yscale*t*(1-t)*(h%-1)*(h%-1)
3360 x%=(fx%-sx%)*t+sx%
3370 ENDIF
3380 ENDIF
3390 trackx%(p%,ptick%)=x%
3400 tracky%(p%,ptick%)=y%
3410 NEXT ptick%
3420 :
3430 WHEN 2:
3440 FOR ptick%=0 TO h%*rtick%-1
3450 trackx%(p%,ptick%)=handx%(sh%,ptick%)
3460 tracky%(p%,ptick%)=handy%(sh%,ptick%)
3470 NEXT ptick%
3480 :
3490 WHEN 1:
3500 FOR ptick%=0 TO rtick%-1
3510 t=ptick%/rtick%
3520 trackx%(p%,ptick%)=(fx%-sx%)*t+sx%
3530 tracky%(p%,ptick%)=(fy%-sy%)*t+sy%+2*yscale*t*(1-t)
3540 NEXT ptick%
3550 :
3560 ENDCASE
3570 ENDIF
3580 NEXT p%
3590 ENDPROC
3600 :
3610 DEF PROCerror
3620 ON ERROR OFF
3630 PROCresetbanks
3640 PRINT "*** Error ***"
3650 REPORT: PRINT " at ";ERL
3660 END
3670 :
3680 DEF PROCresetbanks
3690 SYS "OS_Byte",19          :REM wait for Vsync
3700 SYS "OS_Byte",112,0       :REM reset logical bank
3710 SYS "OS_Byte",113,0       :REM reset physical bank
3720 bank%=1
3730 ENDPROC
3740 :
3750 DEF PROCstartupdate
3760 bank%=3-bank%
3770 SYS "OS_Byte",112,bank% :REM change logical bank
3780 ENDPROC
3790 :
3800 DEF PROCendupdate
3810 SYS "OS_Byte",19          :REM wait for Vsync
3820 SYS "OS_Byte",113,bank% :REM change physical bank
3830 ENDPROC
```

Listing 3

```
   10 REM JugAsm (Juggle3)
   20 REM by Nick Craig-Wood
   30 REM for B/B+/M/C
   40 REM (c) BAU Sep91
   50 :
   60 MODE4
   70 Sy%=255
   80 Sx%=255
   90 midx%=4*0.5*Sx%+128
  100 elbowx%=4*0.25*Sx%
  110 elbowy%=4*0.37*Sy%
  120 r%=16 :REM number of sub ticks/tic
k
  130 r2%=2*r%
  140 ht%=0 :REM height of throw
  150 st%=1 :REM starting hand of throw
  160 ts%=2 :REM current position of thr
ow
  170 ps%=3 :REM position in pt ball was
 thrown
  180 ox%=4: oy%=5 :REM old position of
ball
  190 tl%=6: th%=7: REM place to find tr
ajectory in memory
  200 sx%=320: sy%=256: by%=40*8
  210 PROCasm
  220 RESTORE
  230 FOR i%=0 TO 31 STEP 4
  240 READ stab!i%
  250 NEXT i%
  260 DATA &F81FE007,&FE7FFC3F,&FFFFFE7F
,&FFFFFFFF
  270 DATA &FE7FFFFF,&FC3FFE7F,&E007F81F
,&00000000
  280 :
  290 FOR j%=1 TO 9
  300 CLS: VDU 5: MOVE 112,1008: PRINT ;
j%;: VDU 4
  310 A%=0: X%=0: Y%=0: CALL sprite
  320 FOR i%=0 TO 31
  330 ?(stab+i%+32*j%)=?(scr%+8*(i% MOD
2)+((i% DIV 2)AND7)+24+by%*(i%DIV16))
  340 NEXT i%
  350 NEXT j%
  360 a$="JugCode "+STR$~start%+" "+STR$
~endcode
  370 PRINT "Saving code as ";a$
  380 OSCLI("save "+a$)
  390 CHAIN "Juggle"
  400 END
  410 :
  420 DEF FNr: X%=X%+1: =X%-1
  430 :
  440 DEF PROCasm
  450 PRINT "Assembling ..."
  460 scr%=&5800: code=&5400: ltab=code-
8: stab=&5200: ytab=&5000
  470 balls=&4F00: pt%=&4E00: start%=&4E
00
  480 hands=pt%-4*r2%: tr%=hands-2*45*r%
  490 FOR y%=0 TO 255
  500 a%=scr%+(y% DIV 8)*by%+(y% AND 7)+
3*8
  510 ytab?y%=a% MOD 256
  520 ?(ytab+256+y%)=a% DIV 256
  530 NEXT y%
  540 :
  550 p=&70: hand=&71: nball=&72: n=&73:
 s=&74: c=&75
  560 OSBYTE=&FFF4: OSWRCH=&FFEE: X%=&76
  570 ayl=FNr: ayh=FNr: apl=FNr: aph=FNr
: count=FNr: shifts=FNr
  580 ail=FNr: aih=FNr: s0=FNr: s1=FNr:
s2=FNr: s3=FNr: b=FNr
  590 pballl=FNr: pballh=FNr: i=FNr: px=
FNr: py=FNr: ptick=FNr
  600 ptrackl=FNr: ptrackh=FNr: h=FNr
  610 FOR pass=0 TO 2 STEP 2
  620 P%=code
  630 [opt pass
  640 jmp tickjuggle
  650 .wait
  660 lda s
  670 AND #&80
  680 BNE nowait
  690 LDA #19
  700 JSR OSBYTE
  710 .nowait
  720 RTS
  730 \This plots the sprite in A at X,Y
  740 .sprite
  750 ASL A
  760 ASL A
  770 ASL A
  780 ASL A
  790 ASL A
  800 STA ail
  810 LDA #stab DIV 256
  820 ADC #0
  830 STA aih
  840 STY ayl
  850 LDA #ytab DIV 256
  860 STA ayh
  870 LDY #0
  880 LDA (ayl),Y
  890 STA apl
  900 INC ayh
  910 LDA (ayl),Y
  920 STA aph
  930 TXA
  940 AND #&F8
  950 CLC
  960 ADC apl
  970 STA apl
  980 LDA #0
  990 ADC aph
 1000 STA aph
 1010 TXA
 1020 AND #&7
 1030 STA shifts
 1040 LDA #16
 1050 STA count
 1060 :
 1070 .sprloop
 1080 LDY #0
 1090 LDA (ail),Y
 1100 STA s0
 1110 INC ail
 1120 LDA (ail),Y
 1130 STA s1
 1140 INC ail
 1150 TYA
 1160 LDX shifts
 1170 CPX #0
 1180 BEQ sprnoshift
 1190 .sprshift
 1200 LSR s0
 1210 ROR s1
 1220 ROR A
 1230 DEX
 1240 BNE sprshift
 1250 .sprnoshift
 1260 STA s2
 1270 LDA (apl),Y
 1280 EOR s0
 1290 STA (apl),Y
 1300 LDY #8
 1310 LDA (apl),Y
 1320 EOR s1
 1330 STA (apl),Y
 1340 LDY #16
 1350 LDA (apl),Y
 1360 EOR s2
 1370 STA (apl),Y
 1380 :
 1390 INC apl
 1400 BNE spr1
 1410 INC aph
 1420 .spr1
 1430 INC ayl
 1440 LDA ayl
 1450 AND #&7
 1460 BNE spr2
 1470 CLC
 1480 LDA apl
 1490 ADC #(by%-8) MOD 256
 1500 STA apl
 1510 LDA aph
 1520 ADC #(by%-8) DIV 256
 1530 STA aph
 1540 .spr2
 1550 DEC count
 1560 BNE sprloop
 1570 RTS
 1580 :
 1590 .plotballs
 1600 LDA #0
 1610 STA i
 1620 STA pballl
 1630 LDA #balls DIV 256
 1640 STA pballh
 1650 .ptbloop
 1660 LDY #ht%
 1670 LDA (pballl),Y
 1680 CMP #255
 1690 BNE ptb9
 1700 JMP notplotball
 1710 .ptb9
 1720 LDY #ts%
 1730 LDA #0
 1740 STA ptrackh
 1750 LDA (pballl),Y
 1760 ASL A
 1770 ROL ptrackh
 1780 ASL A
 1790 ROL ptrackh
 1800 ASL A
 1810 ROL ptrackh
 1820 ASL A
 1830 ROL ptrackh  \*r% (*16)
 1840 CLC
 1850 ADC ptick
 1860 STA ptrackl
 1870 LDA #0
 1880 ADC ptrackh
 1890 STA ptrackh
 1900 ASL ptrackl
 1910 ROL ptrackh
 1920 LDY #ht%
 1930 LDA (pballl),Y
 1940 ASL A
 1950 ASL A
 1960 ASl A
 1970 STA s0
 1980 LDA #balls DIV 256
 1990 STA s1
 2000 LDY #tl%
 2010 LDA (s0),Y
 2020 STA s2
 2030 INY
 2040 LDA (s0),Y
 2050 STA s3
 2060 CLC
 2070 LDA ptrackl
 2080 ADC s2
 2090 STA ptrackl
 2100 LDA ptrackh
 2110 ADC s3
 2120 STA ptrackh
 2130 LDY #0
 2140 LDA (ptrackl),Y
 2150 STA px
 2160 INY
 2170 LDA (ptrackl),Y
 2180 STA py
 2190 LDY #st%
 2200 LDA (pballl),Y
 2210 CMP #0
 2220 BEQ ptb1
 2230 LDA px
 2240 EOR #255
 2250 STA px
 2260 .ptb1
 2270 LDA py
 2280 EOR #255
 2290 STA py
 2300 JSR wait
 2310 LDY #ox%
 2320 LDA (pballl),Y
 2330 TAX
 2340 LDY #oy%
 2350 LDA (pballl),Y
 2360 TAY
 2370 LDA i
 2380 CLC
 2390 ADC #1
 2400 CPX #255
 2410 BEQ ptb3
 2420 JSR sprite
 2430 .ptb3
 2440 LDA i
 2450 CLC
 2460 ADC #1
 2470 LDX px
 2480 LDY py
 2490 JSR sprite
 2500 LDY #ox%
 2510 LDA px
 2520 STA (pballl),Y
 2530 LDY #oy%
 2540 LDA py
 2550 STA (pballl),Y
 2560 .notplotball
 2570 LDA #8
 2580 CLC
 2590 ADC pballl
 2600 STA pballl
 2610 INC i
 2620 LDA i
 2630 CMP nball
 2640 BEQ ptb8
 2650 JMP ptbloop
 2660 .ptb8
 2670 RTS
 2680 :
 2690 .tickjuggle
 2700 INC p
 2710 LDA p
 2720 CMP n
 2730 BCC tkj0
 2740 LDA #0
 2750 STA p
 2760 .tkj0
 2770 TAY
 2780 LDA pt%,Y
 2790 STA h
 2800 LDA #255
 2810 STA b
 2820 STA c
 2830 LDA #0
 2840 STA i
 2850 STA pballl
 2860 LDA #balls DIV 256
 2870 STA pballh
 2880 .tkjloop
 2890 LDY #ht%
 2900 LDA (pballl),Y
 2910 STA s0
 2920 LDY #ts%
 2930 LDA (pballl),Y
 2940 CLC
 2950 ADC #1
 2960 STA (pballl),Y
 2970 STA s1
 2980 LDA s0
 2990 CMP #255
 3000 BNE tkjtest
 3010 LDA i
 3020 STA c
 3030 JMP tkjnotest
 3040 .tkjtest
 3050 LDA s1
 3060 CMP s0
 3070 BCC tkjnotest
 3080 LDA i
 3090 STA b
 3100 .tkjnotest
 3110 LDA #8
 3120 CLC
 3130 ADC pballl
 3140 STA pballl
 3150 INC i
 3160 LDA i
 3170 CMP nball
 3180 BNE tkjloop
 3190 LDA h
 3200 CMP #0
 3210 BEQ tkjnothrow
 3220 LDA b
 3230 CMP #255
 3240 BNE tkj1
 3250 LDA c
 3260 CMP #255
 3270 BEQ tkjnothrow
 3280 .tkj1
 3290 ASL A
 3300 ASL A
 3310 ASL A
 3320 STA pballl
 3330 LDA #balls DIV 256
 3340 STA pballh
 3350 LDY #ht%
 3360 LDA h
 3370 STA (pballl),Y
 3380 LDY #ts%
 3390 LDA #0
 3400 STA (pballl),Y
 3410 LDY #ps%
 3420 LDA p
 3430 STA (pballl),Y
 3440 LDY #st%
 3450 LDA hand
 3460 STA (pballl),Y
 3470 .tkjnothrow
 3480 LDA #0
 3490 STA ptick
 3500 .tkjloopt
 3510 JSR plotlines
 3520 JSR plotballs
 3530 LDA s
 3540 AND #&7F
 3550 CLC
 3560 ADC ptick
 3570 STA ptick
 3580 CMP #r%
 3590 BCC tkjloopt
 3600 LDA hand
 3610 EOR #1
 3620 STA hand
 3630 LDA #129
 3640 LDX #0
 3650 LDY #0
 3660 JSR OSBYTE
 3670 STX c
 3680 CPY #&FF
 3690 BNE tkj9
 3700 JMP tickjuggle
 3710 .tkj9
 3720 RTS
 3730 :
 3740 .calchand
 3750 LDY b
 3760 LDA hands,Y
 3770 STA s0
 3780 INY
 3790 LDA hands,Y
 3800 STA s2
 3810 INY
 3820 STY b
 3830 LDA #0
 3840 ASL s0
 3850 ROL A
 3860 ASL s0
 3870 ROL A
 3880 STA s1
 3890 LDA s0
 3900 CLC
 3910 ADC #128
 3920 STA s0
 3930 LDA s1
 3940 ADC #0
 3950 STA s1
 3960 LDA #0
 3970 ASL s2
 3980 ROL A
 3990 ASL s2
 4000 ROL A
 4010 STA s3
 4020 LDA s2
 4030 SEC
 4040 SBC #40
 4050 STA s2
 4060 LDA s3
 4070 SBC #0
 4080 STA s3
 4090 RTS
 4100 :
 4110 .plotlines
 4120 LDA ptick
 4130 ASL A
 4140 ASL A
 4150 STA b
 4160 LDA hand
 4170 CMP #0
 4180 BEQ ptl1
 4190 LDA b
 4200 CLC
 4210 ADC #2*r2%
 4220 STA b
 4230 .ptl1
 4240 LDA ltab+0
 4250 STA s0
 4260 LDA ltab+1
 4270 STA s1
 4280 LDA ltab+2
 4290 STA s2
 4300 LDA ltab+3
 4310 STA s3
 4320 JSR wait
 4330 JSR leftarm
 4340 JSR calchand
 4350 JSR leftarm
 4360 LDA s0
```

```
4370 STA ltab+0
4380 LDA s1
4390 STA ltab+1
4400 LDA s2
4410 STA ltab+2
4420 LDA s3
4430 STA ltab+3
4440 LDA ltab+4
4450 STA s0
4460 LDA ltab+5
4470 STA s1
4480 LDA ltab+6
4490 STA s2
4500 LDA ltab+7
4510 STA s3
4520 JSR wait
4530 JSR rightarm
4540 JSR calchand
4550 JSR rightarm
4560 LDA s0
4570 STA ltab+4
4580 LDA s1
4590 STA ltab+5
4600 LDA s2
4610 STA ltab+6
4620 LDA s3
4630 STA ltab+7
4640 RTS
4650 :
4660 .leftarm
4670 LDA s0
4680 CMP #&FF
4690 BEQ leftarmend
4700 OPT FNline(midx%-elbowx%,elbowy%)
4710 .leftarmend
4720 RTS
4730 :
4740 .rightarm
4750 LDA s0
4760 CMP #&FF
4770 BEQ rightarmend
4780 OPT FNline(midx%+elbowx%,elbowy%)
4790 .rightarmend
4800 RTS
4810 :
4820 .endcode
4830 ]
4840 NEXT pass
4850 ENDPROC
4860 :
4870 DEF FNline(x%,y%)
4880 [OPT pass
4890 LDA #25
4900 JSR OSWRCH
4910 LDA #4
4920 JSR OSWRCH
4930 LDA #(x% MOD 256)
4940 JSR OSWRCH
4950 LDA #(x% DIV 256)
4960 JSR OSWRCH
4970 LDA #(y% MOD 256)
4980 JSR OSWRCH
4990 LDA #(y% DIV 256)
5000 JSR OSWRCH
5010 LDA #25
5020 JSR OSWRCH
5030 LDA #5
5040 JSR OSWRCH
5050 LDA s0
5060 JSR OSWRCH
5070 LDA s1
5080 JSR OSWRCH
5090 LDA s2
5100 JSR OSWRCH
5110 LDA s3
5120 JSR OSWRCH
5130 ]
5140 =pass
```

Listing 4

```
10 REM Juggle (Juggle4)
20 REM by Nick Craig-Wood
30 REM for B/B+/M/C
40 REM (c) BAU Sep 91
50 :
60 MODE4
70 VDU 23;8202;0;0;0;
80 Sy%=255: Sx%=255
90 rh%=Sy%/12
100 lx%=0.25*Sx%: rx%=0.75*Sx%
110 lx0%=lx%+rh%: lx1%=lx%-rh%
120 rx0%=rx%-rh%: rx1%=rx%+rh%
130 midx%=4*0.5*Sx%+128
140 chesty%=4*0.7*Sy%
150 shoulderx%=4*0.15*Sx%
160 shouldery%=4*0.65*Sy%
170 elbowx%=4*0.25*Sx%
180 elbowy%=4*0.37*Sy%
190 headd%=4*0.12*Sy%
200 heady%=4*Sy%-headd%
210 bottomy%=0
220 hty%=0.8*Sy%
230 basey%=rh%+16
240 r%=16
250 s%=2  :REM speed of ticking throug
h subticks
260 xs%=1 :REM extra fast mode
270 m%=256:REM max length of pt
280 r2%=2*r%: r4%=4*r%
290 ht%=0: st%=1: ts%=2: ps%=3
300 ox%=4: oy%=5: tl%=6: th%=7
310 PROCgetcode
320 DIM tp%(9)
330 a%=0
340 FOR i%=0 TO 9
350 tp%(i%)=tr%+2*r%*a%
360 a%=a%+i%
370 NEXT i%
380 FOR i%=0 TO 9
390 a%=balls+8*i%+tl%
400 ?a%=tp%(i%) MOD 256
410 a%?1=tp%(i%) DIV 256
420 NEXT i%
430 REPEAT
440 PROCgetpt
450 PRINT "Computing throws ... ";
460 PROCtrack
470 PROCjuggle
480 UNTIL FALSE
490 END
500 :
510 DEF PROCgetpt
520 PRINT TAB(0,1);
530 PRINT "Whilst the program is juggl
ing"
540 PRINT "  F make it go faster"
550 PRINT "  S makes it go slower"
560 PRINT "  X toggles slow/fast mode"
570 PRINT "and SPACE enters another pa
ttern"
580 PRINT
590 prompt$="Enter pattern (Q to Quit
E for Examples)"
600 PRINT prompt$
610 REPEAT
620 INPUT p$
630 IF LENp$>m% THEN PRINT "pattern to
o big": ok=FALSE: p$="3"
640 n%=0
650 FOR i%=1 TO LENp$
660 a$=MID$(p$,i%,1): IF a$>="a" AND a
$<="z" THEN a$=CHR$(ASCa$-32)
670 IF a$<"0" OR a$>"9" GOTO 710
680 pt%?n%=ASCa$-ASC"0"
690 n%=n%+1
700 GOTO 780
710 IF a$="Q" THEN END
720 IF a$<>"E" THEN GOTO 760
730 PROCshowexamples
740 PRINT prompt$
750 UNTIL 0
760 PRINT "Unrecognised command: ";a$
770 UNTIL 0
780 NEXT i%
790 IF n%=0 THEN pt%?0=3: n%=1: p$="3"
800 IF (n% AND 1)=0 THEN GOTO 860
810 IF 2*n%>m% THEN PRINT "pattern too
 big": UNTIL 0
820 FOR i%=0 TO n%-1
830 pt%?(n%+i%)=pt%?i%
840 NEXT i%
850 n%=2*n%
860 IF NOT FNgetsum THEN UNTIL 0
870 IF NOT FNgetav THEN UNTIL 0
880 IF NOT FNvalidpat THEN UNTIL 0
890 UNTIL TRUE
900 IF max%>1 THEN yscale=hty%/0.25/((
max%-1)*(max%-1)) ELSE yscale=hty%
910 rn%=r%*n%
920 ENDPROC
930 :
940 DEF PROCshowexamples
950 CLS
960 PRINT "Example patterns"
970 PRINT
980 PRINT "0 - 9 cascade 0 - 9 balls"
990 PRINT "31,51,71,91 shower 2,3,4,5
balls"
1000 PRINT
1010 PRINT "How to learn to juggle 3 ba
lls"
1020 PRINT "300, 3302, 2330, 330, 333"
1030 PRINT
1040 PRINT "How to learn to juggle 4 ba
lls"
1050 PRINT "423, 40, 04, 4440, 441, 4"
1060 PRINT
1070 PRINT "How to learn to juggle 5 ba
lls"
1080 PRINT "51, 15, 55500, 50505, 552,
55550, 5"
1090 PRINT
1100 PRINT "Some other interesting patt
erns"
1110 PRINT "423, 55500, 51, 531, 504, 6
12"
1120 PRINT "71, 53444, 53, 633, 552, 55
550, 5551"
1130 PRINT "333333333451515151514l"
1140 PRINT
1150 PRINT "Interesting, but impossible
!"
1160 PRINT "123456789, 97531, 747, 678"
1170 PRINT
1180 ENDPROC
1190 :
1200 DEF FNgetsum
1210 ok=TRUE
1220 sum%=0: max%=-1
1230 FOR i%=0 TO n%-1
1240 a%=pt%?i%
1250 sum%=sum%+a%
1260 IF a%>max% THEN max%=a%
1270 NEXT i%
1280 =ok
1290 :
1300 DEF FNgetav
1310 ok=TRUE
1320 nb=sum%/n%
1330 IF nb-INT(nb)<>0 THEN PRINT "patte
rn was for ";nb;" balls!": ok=FALSE
1340 nball%=INT(nb)
1350 =ok
1360 DEF FNvalidpat
1370 ok=TRUE
1380 FOR i%=0 TO n%-2
1390 FOR j%=i%+1 TO n%-1
1400 IF pt%?i%+i%=pt%?j%+j% THEN ok=FAL
SE
1410 NEXT j%
1420 NEXT i%
1430 IF NOT ok THEN PRINT "Pattern invo
lved catching more than one ball at a ti
me"
1440 =ok
1450 :
1460 DEF PROCjuggle
1470 CLS: PRINT p$: VDU 23,1,0;0;0;0;
1480 GCOL 0,1
1490 MOVE midx%,chesty%
1500 PLOT 5,midx%-shoulderx%,shouldery%
1510 PLOT 5,midx%-elbowx%,elbowy%
1520 MOVE midx%,chesty%
1530 PLOT 5,midx%+shoulderx%,shouldery%
1540 PLOT 5,midx%+elbowx%,elbowy%
1550 MOVE midx%,heady%-headd%: PLOT 5,m
idx%,bottomy%
1560 MOVE midx%+headd%,heady%
1570 FOR t=0 TO 2.05*PI STEP PI/10
1580 PLOT 5,midx%+headd%*COS(t),heady%+
headd%*SIN(t)
1590 NEXT t
1600 GCOL 3,1
1610 PLOT 69,midx%-elbowx%,elbowy%: PLO
T 69,midx%+elbowx%,elbowy%
1620 FOR i%=0 TO 9
1630 a%=balls+8*i%
1640 a%?ht%=255
1650 a%?ts%=0
1660 a%?ox%=255
1670 NEXT i%
1680 ?p=nball%-1: ?hand=0: ?nball=nball
%: ?n=n%
1690 !ltab=-1: ltab!4=-1
1700 REPEAT
1710 REPEAT
1720 ?s=s%+128*xs%: CALL code
1730 a$=CHR$(?c)
1740 UNTIL a$<>""
1750 mego=FALSE
1760 REPEAT
1770 IF a$="+" OR a$="F" OR a$="f" THEN
s%=2*s%: IF s%>r% s%=r%
1780 IF a$="-" OR a$="S" OR a$="s" THEN
s%=s%/2: IF s%<1 s%=1
1790 IF a$="X" OR a$="x" THEN xs%=1-xs%
1800 IF a$=" " THEN mego=TRUE
1810 IF a$="Q" OR a$="q" THEN END
1820 a$=INKEY$(0)
1830 UNTIL a$="" OR mego
1840 UNTIL mego
1850 ENDPROC
1860 :
1870 DEF PROCtrack
1880 REM first track the hands
1890 FOR ptick%=0 TO r2%-1
1900 t=PI*ptick%/r%
1910 a%=hands+4*ptick%
1920 a%?0=lx%+rh%*SIN(t)
1930 a%?1=basey%-rh%*COS(t)
1940 a%?2=rx%+rh%*SIN(t)
1950 a%?3=basey%+rh%*COS(t)
1960 NEXT ptick%
1970 REM now make each ball track
1980 sh%=0
1990 FOR h%=1 TO max%
2000 IF INSTR(p$,STR$h%)=0 THEN GOTO 23
90
2010 PRINT ;h%;
2020 IF (h% AND 1) THEN fh%=2-sh% ELSE
fh%=sh%
2030 k0%=r%/2: k1%=h%*r%-r%/2
2040 IF h%=1 THEN k0%=0: k1%=r%
2050 a%=hands+sh%+4*(k0% MOD r2%): sx%=
a%?0: sy%=a%?1
2060 a%=hands+fh%+4*(k1% MOD r2%): fx%=
a%?0: fy%=a%?1
2070 IF h%<=2 THEN GOTO 2270
2080 FOR ptick%=0 TO h%*r%-1
2090 ti=ptick%/r%
2100 IF ti>=0.5 THEN GOTO 2150
2110 a%=hands+sh%+4*(ptick% MOD r2%)
2120 x%=a%?0
2130 y%=a%?1
2140 GOTO 2230
2150 IF ti<h%-0.5 THEN GOTO 2200
2160 a%=hands+fh%+4*(ptick% MOD r2%)
2170 x%=a%?0
2180 y%=a%?1
2190 GOTO 2230
2200 t=(ti-0.5)/(h%-1)
2210 y%=(fy%-sy%)*t+sy%+yscale*t*(1-t)*
(h%-1)*(h%-1)
2220 x%=(fx%-sx%)*t+sx%
2230 ?(tp%(h%)+2*ptick%)=x%
2240 ?(tp%(h%)+2*ptick%+1)=y%
2250 NEXT ptick%
2260 GOTO 2390
2270 IF h%<=1 THEN GOTO 2340
2280 FOR ptick%=0 TO h%*r%-1
2290 a%=hands+sh%+4*(ptick% MOD r2%)
2300 ?(tp%(h%)+2*ptick%)=a%?0
2310 ?(tp%(h%)+2*ptick%+1)=a%?1
2320 NEXT ptick%
2330 GOTO 2390
2340 FOR ptick%=0 TO r%-1
2350 t=ptick%/r%
2360 ?(tp%(h%)+2*ptick%)=(fx%-sx%)*t+sx
%
2370 ?(tp%(h%)+2*ptick%+1)=(fy%-sy%)*t+
sy%+2*yscale*t*(1-t)
2380 NEXT ptick%
2390 NEXT h%
2400 ENDPROC
2410 :
2420 DEF PROCgetcode
2430 scr%=&5800: code=&5400: ltab=code-
8: stab=&5200: ytab=&5000
2440 balls=&4F00: pt%=&4E00: start%=&4E
00
2450 hands=pt%-4*r2%: tr%=hands-2*45*r%
2460 p=&70: hand=&71: nball=&72: n=&73:
s=&74: c=&75
2470 *load jugcode
2480 ENDPROC
```

Wide VDU

Listing 1

```
10 REM WideSrc (Wide1)
20 REM by John Robinson
30 REM for B only
40 REM (c) BAU Sep 91
50 :
60 PROCinitialise
70 PROCassemble
80 PROCsave
90 END
100 :
110 DEF PROCinitialise
120 DIM code &200
130 characters=102      :REM Change th
is if necessary
140 lines=INT(&5000/(characters*8))
150 origin=&C00-2*lines-30
160 zp=&A8
170 curMode=&355
180 CRTCregister=&FE00
190 CRTCdata=&FE01
200 osbyte=&FFF4
210 osargs=&FFDA
220 gsinit=&FFC2
230 oswrch=&FFEE
240 wrchv=oswrch!1 AND &FFFF
250 ENDPROC
260 :
270 DEF PROCassemble
280 FOR pass=4 TO 7 STEP 3
290 P%=origin
300 O%=code
310 [OPT pass
320 .newtable
330 ]
340 FOR line=0 TO lines-1
350 [OPT pass AND 6
360 EQUB (line*characters*8) DIV 256
370 EQUB (line*characters*8) MOD 256
380 ]
390 NEXT line
400 [OPT pass
410 .tableCRTC
420 EQUB 1:EQUB characters
430 EQUB 2:EQUB (characters DIV 2)+57
440 EQUB 4:EQUB 34
450 EQUB 6:EQUB lines
460 EQUB 7:EQUB (lines DIV 2)+18
470 EQUB 9:EQUB 8
480 EQUB 0
490 :
500 .table_4_CRTC
510 EQUB 1:EQUB characters/2
520 EQUB 2:EQUB ((characters DIV 2)+57
) DIV 2
530 EQUB 4:EQUB 34
540 EQUB 6:EQUB lines
550 EQUB 7:EQUB (lines DIV 2)+18
560 EQUB 9:EQUB 8
570 EQUB 0
580 :
590 .goldv EQUB &4C
600 .oldv EQUW 0
610 .newmodeflag EQUB 0
620 :
630 .init_start
```

```
 640 LDA #1
 650 LDX #zp
 660 LDY #Ø
 670 JSR osargs
 680 LDY zp+1
 690 LDX zp
 700 STY &F3        Pointer used by GSR
EAD
 710 STX &F2
 720 CLC
 730 LDY #Ø
 740 JSR gsinit
 750 BEQ no_bad_syntax
 760 BRK
 770 EQUB 254
 780 EQUS "Syntax: *Wide"+STR$character
s
 790 EQUB Ø
 800 :
 810 .no_bad_syntax
 820 LDA #&9Ø       Set *TV parameters
 830 LDX #Ø
 840 LDY #1
 850 JSR osbyte
 860 LDY wrchv+1    Save old vector con
tents
 870 LDX wrchv
 880 STY oldv+1
 890 STX oldv
 900 LDY #newwrch DIV 256
 910 LDX #newwrch MOD 256
 920 STY wrchv+1    Install new routine
 930 STX wrchv
 940 LDA #22        Go into mode Ø
 950 JSR oswrch     (that's the OF mode
 Ø)
 960 LDA #Ø
 970 JSR oswrch
 980 RTS
 990 :
 1000 .newwrch
 1010 PHA
 1020 TXA
 1030 PHA
 1040 TYA
 1050 PHA
 1060 TSX
 1070 LDA &1Ø3,X
 1080 LDX newmodeflag
 1090 BEQ checknewmode
 1100 JSR goldv
 1110 LDX #Ø
 1120 STX newmodeflag
 1130 ORA #Ø
 1140 BEQ do_XtraWide
 1150 CMP #4
 1160 BNE exit
 1170 .do_XtraWide
 1180 JSR setUpXtraWide
 1190 :
 1200 .exit
 1210 PLA
 1220 TAY
 1230 PLA
 1240 TAX
 1250 PLA
 1260 RTS
 1270 :
 1280 .checknewmode
 1290 LDX &DA+&19Ø   Equivalent to read
using OSBYTE &DA; length of VDU queue
 1300 BNE execexit
 1310 CMP #22
 1320 BNE execexit
 1330 STA newmodeflag
 1340 :
 1350 .execexit
 1360 JSR goldv
 1370 JMP exit
 1380 :
 1390 .setUpXtraWide
 1400 LDA curMode
 1410 BNE mode4table
 1420 TAX
 1430 BEQ redefine_CRTC
 1440 :
 1450 .mode4table
 1460 LDX #table_4_CRTC-tableCRTC
 1470 :
 1480 .redefine_CRTC
 1490 LDA tableCRTC,X
 1500 BEQ finished_CRTC
 1510 STA CRTCregister
 1520 INX
 1530 LDA tableCRTC,X
 1540 STA CRTCdata
 1550 INX
 1560 BNE redefine_CRTC
 1570 :
 1580 .finished_CRTC
 1590 LDY #characters*8 DIV 256
 1600 LDX #characters*8 MOD 256
 1610 LDA curMode
 1620 BEQ noDiv2
 1630 TYA             Mode 4; Lines are h
alf as long, so we
 1640 LSR A           must divide new lin
e length by 2
 1650 TAY
 1660 TXA
 1670 ROR A
 1680 TAX
 1690 :
 1700 .noDiv2
 1710 STY &353        Screen width in byt
es
 1720 STX &352
 1730 STY &34D        Text window width i
n bytes
 1740 STX &34C
 1750 LDA #Ø
 1760 STA &361        Not a graphics mode
 any more
 1770 LDA #lines-1
 1780 STA &3Ø9        Bottom row of text
window, in character rows
 1790 LDA #characters-1
 1800 LDX curMode
 1810 BEQ nochangechars
 1820 LDA #(characters DIV 2)-1
 1830 :
 1840 .nochangechars
 1850 STA &3ØA        Rightmost column of
 text window, in characters
 1860 LDY #newtable DIV 256
 1870 LDX #newtable MOD 256
 1880 STY &E1         OS pointer to multi
plication tables
 1890 STX &EØ         This isn't on the M
aster so this program can't work
 1900 RTS
 1910 :
 1920 ]
 1930 NEXT pass
 1940 ENDPROC
 1950 :
 1960 DEF PROCsave
 1970 save$="*SAVE Wide"+STR$characters+
" "+STR$~code+" "+STR$~O%+" "+STR$~(init
_start OR &FFFFØØØØ)+" "+STR$~(origin OR
 &FFFFØØØØ)
 1980 PRINT save$;" ? (Y/N) ";
 1990 IF (GET OR &2Ø)=ASC "y" THEN PRINT
 "Yes":OSCLI save$:PRINT "OK" ELSE PRINT
 "No"
 2000 ENDPROC
```

Shopping

Listing 1

```
   10 REM Trolley (Trolley1)
   20 REM By Dave Lawrence
   30 REM For BBC B/B+/M/C/A
   40 REM (c) BAU September 1991
   50 :
   60 list$="BAUlist"
   70 arc=(HIMEM>&1ØØØØ)
   80 IF NOT arc AND PAGE>&13ØØ THEN PAG
E=&13ØØ:CHAIN "Trolley"
   90 ON ERROR time$="":GOTO 11Ø
  100 time$=TIME$
  110 ON ERROR OFF
  120 :
  130 MODE 7
  140 PROCcursor(Ø)
  150 PROCinit
  160 PROCscreen
  170 PROCdate
  180 ON ERROR PROCerror:GOTO 19Ø
  190 REPEAT
  200 opt=FNmenu
  210 IF opt=1 PROCload
  220 IF opt=2 PROCedit
  230 IF opt=3 PROCsave
  240 IF opt=4 PROClist
  250 UNTIL opt=5
  260 *FX 4,Ø
  270 *FX 225,1
  280 *FX 229,Ø
  290 MODE 7
  300 END
  310 :
  320 DEF PROCerr(err$)
  330 IF arc ERROR 1,err$
  340 $&1ØØ=CHR$Ø+CHR$1+err$+CHR$Ø:CALL
&1ØØ
  350 ENDPROC
  360 :
  370 DEF PROCerror
  380 CLOSE #Ø
  390 VDU 26,31,Ø,22,131,157,129,31,Ø,23
,131,157,129
  400 VDU 28,3,23,39,22,7
  410 REPORT
  420 PRINT'"       Press space to continu
e";
  430 IFGET
  440 VDU 28,Ø,23,39,22,12,26
  450 ENDPROC
  460 :
  470 DEF PROCinit
  480 Name=Ø
  490 Total=24
  500 Dates=28
  510 Size=96
  520 IF arc maxitems=5ØØ ELSE maxitems=
13Ø
  530 maxslots=8 : REM up to 17
  540 maxlen=23
  550 scrmax=2Ø
  560 none=255
  570 DIM Data maxitems*Size,count maxit
ems
  580 DIM opt$(4),doy(11)
  590 DIM date(maxslots-1),num(maxslots-
1)
  600 FOR opt=Ø TO 4
  610 READ opt$(opt)
  620 NEXT
  630 doy=Ø
  640 m$=""
  650 FOR i=Ø TO 11
  660 READ m$,dim
  670 mons$=mons$+m$
  680 doy(i)=doy
  690 doy=doy+dim
  700 NEXT
  710 items=Ø
  720 dosave=FALSE
  730 sorted=TRUE
  740 PROCclear(items)
  750 *FX 4,1
  760 *FX 225,14Ø
  770 *FX 229,1
  780 ENDPROC
  790 :
  800 DEF PROCcursor(c%)
  810 VDU 23;1Ø,255-c%*63;Ø;Ø;Ø;
  820 ENDPROC
  830 :
  840 DATA Load new file,Edit list,Save
file,Produce list,Quit program
  850 DATA Jan,31,Feb,28,Mar,31,Apr,3Ø,M
ay,31,Jun,3Ø
  860 DATA Jul,31,Aug,31,Sep,3Ø,Oct,31,N
ov,3Ø,Dec,31
  870 :
  880 DEF PROCscreen
  890 FOR i=Ø TO 1
  900 VDU 31,Ø,i,132,157
  910 PRINTTAB(1Ø)CHR$134CHR$141"Shoppin
g List"
  920 NEXT
  930 VDU 31,Ø,24,129,157,131
  940 PROCshowname("")
  950 ENDPROC
  960 :
  970 DEF PROCshowname(a$)
  980 PRINTTAB(2,24);CHR$131;CHR$34;a$;C
HR$34;STRING$(1Ø-LENa$," ");
  990 ENDPROC
 1000 :
 1010 DEF PROCcls
 1020 VDU 28,Ø,23,39,2,12,26
 1030 ENDPROC
 1040 :
 1050 DEF PROCdate
 1060 IF time$="" OR time$="Fri,31 Dec 1
999.23:59:59" today$=FNgetdate ELSE toda
y$=MID$(time$,5,11)
 1070 PRINTTAB(26,24);today$;
 1080 today=FNfromtext(today$)
 1090 ENDPROC
 1100 :
 1110 DEF FNgetdate
 1120 in=OPENIN("Date")
 1130 IF in=Ø a$="Ø1 Jan 1991" ELSE a$=F
Ngetline(in)
 1140 CLOSE #in
 1150 day=FNfromtext(a$)
 1160 last=day
 1170 old=-1
 1180 PRINTTAB(7,1Ø);"Please enter today
's date"
 1190 REPEAT
 1200 IF day<>old PRINTTAB(1Ø,12);CHR$13
1;"[ ";CHR$13Ø;FNtotext(day);CHR$131;" ]
";
 1210 key$=GET$
 1220 old=day
 1230 IF INKEY-1 add%=7 ELSE add%=1
 1240 IF key$=CHR$136 day=day-add%:IF da
y<last day=last
 1250 IF key$=CHR$137 day=day+add%
 1260 UNTIL key$=CHR$13
 1270 PROCcls
 1280 d$=FNtotext(day)
 1290 out=OPENOUT("Date")
 1300 PROCstrput(out,d$+CHR$1Ø)
 1310 CLOSE#out
 1320 =d$
 1330 :
 1340 DEF FNmenu
 1350 PROCcls
 1360 FOR opt=Ø TO 4
 1370 PRINTTAB(11,5+opt*2);CHR$13Ø;"<";L
EFT$(opt$(opt),1);">";CHR$131;opt$(opt)
 1380 NEXT
 1390 PRINTTAB(13,16);"Select Option:";
 1400 PROCcursor(1)
 1410 REPEAT
 1420 k$=GET$
 1430 IF k$=CHR$27 k$="E"
 1440 opt=INSTR(" LlEeSsPpQq",k$)DIV2
 1450 UNTIL opt<>Ø
 1460 PROCcursor(Ø)
 1470 =opt
 1480 :
 1490 DEF PROCload
 1500 PROCcls
 1510 new$=FNlist("load",list$)
 1520 IF new$="" ENDPROC
 1530 items=FNloadlist(new$)
 1540 list$=new$
 1550 PROCclear(items)
 1560 sorted=TRUE
 1570 ENDPROC
 1580 :
 1590 DEF FNlist(pr$,l$)
 1600 PRINTTAB(11,5);"Enter file to ";pr
$;TAB(15,8);"———";TAB(14,7);CHR$1
3Ø;l$;
 1610 PROCcursor(1)
 1620 REPEAT
 1630 k$=GET$
 1640 IF k$=CHR$127 AND l$<>"" l$=LEFT$(
l$,LENl$-1):VDU 127
 1650 IF ASCk$>32 AND ASCk$<127 AND LENl
$<1Ø PRINTk$;:l$=l$+k$
 1660 IF ASCk$=21 PRINTSTRING$(LENl$,CHR
$127);:l$=""
 1670 UNTIL k$=CHR$27 OR k$=CHR$13
 1680 IF k$=CHR$27 l$=""
 1690 PROCcursor(Ø)
 1700 =l$
 1710 :
 1720 DEF FNloadlist(name$)
 1730 in=OPENIN(name$)
 1740 IF in=Ø PROCerr("File not found")
 1750 PROCshowname(name$)
 1760 line=Ø
 1770 item=Ø
 1780 l$=FNmustbe("list:")
 1790 l$=FNmustbe("last:")
 1800 REPEAT
 1810 REPEAT
 1820 c%=BGET#in
 1830 UNTIL c%>31
 1840 PTR#in=PTR#in-1
 1850 item$=FNmustbe("item:")
 1860 total=VALFNmustbe("total:")
 1870 PROCinform("Loading",item$)
 1880 PROCclear(item)
 1890 $(Data+item*Size)=item$
 1900 !(Data+item*Size+Total)=total
 1910 IF total<>Ø PROCloaddates
 1920 item=item+1
 1930 UNTIL EOF#in
 1940 CLOSE #in
 1950 dosave=FALSE
 1960 =item
 1970 :
 1980 DEF FNmustbe(str$)
 1990 LOCAL in$
 2000 in$=FNgetline(in)
 2010 IF LEFT$(in$,LENstr$)<>str$ PROCer
r("File format error")
 2020 =FNskip(in$)
 2030 :
 2040 DEF PROCinform(a$,b$)
 2050 PRINTTAB(Ø,23);CHR$131;CHR$157;CHR
$129;a$;CHR$32;CHR$34;b$;CHR$34;STRING$(
39-POS," ")
 2060 ENDPROC
 2070 :
 2080 DEF FNgetline(f)
 2090 l$=""
 2100 REPEAT
 2110 c=BGET#f
 2120 IF c>31 l$=l$+CHR$c
 2130 UNTIL c<32
 2140 line=line+1
 2150 =l$
 2160 :
 2170 DEF FNskip(l$)
 2180 l=INSTR(l$," ")-1
 2190 REPEAT
 2200 l=l+1
 2210 UNTIL MID$(l$,l,1)<>" "
 2220 =MID$(l$,l)
 2230 :
 2240 DEF FNmonthnum(m$)
 2250 LOCAL mn%
 2260 mn%=INSTR(mons$,m$)-1
 2270 IF mn%<Ø PRINT"Unknown month : ";m
$:END
 2280 =mn% DIV 3
 2290 :
 2300 DEF FNlow(u$)
 2310 IF u$="" THEN =""
 2320 LOCAL l$,i,c
 2330 l$=""
 2340 FOR i=1 TO LENu$
 2350 c=ASCMID$(u$,i,1)
 2360 IF c>=ASC"A" AND c<=ASC"Z" l$=l$+C
HR$(c+32) ELSE l$=l$+CHR$c
```

```
2370 NEXT
2380 =l$
2390 :
2400 DEF PROCloaddates
2410 date=0
2420 REPEAT
2430 a$=FNgetline(in)
2440 IF LEFT$(a$,5)="date:" PROCadddate(FNskip(a$))
2450 UNTIL a$="" OR EOF#in
2460 ENDPROC
2470 :
2480 DEF PROCadddate(date$)
2490 date$=date$+" (1)"
2500 num=INSTR(date$,"(")
2510 num=VALMID$(date$,num+1)
2520 PROCsetdate(item,date,date$,num)
2530 date=date+1
2540 ENDPROC
2550 :
2560 DEF PROCclear(i%)
2570 IF i%>=maxitems ENDPROC
2580 LOCAL i
2590 FOR i=0 TO Size-1 STEP 4
2600 i!(Data+i%*Size)=0
2610 NEXT
2620 ?(Data+i%*Size)=13
2630 count?i%=none
2640 ENDPROC
2650 :
2660 DEF PROCswap(a%,b%)
2670 LOCAL i%,t%
2680 FOR i%=0 TO Size-1 STEP 4
2690 t%=i%!(Data+a%*Size)
2700 i%!(Data+a%*Size)=i%!(Data+b%*Size)
2710 i%!(Data+b%*Size)=t%
2720 NEXT
2730 ENDPROC
2740 :
2750 DEF FNitem(i%)
2760 IF i%>=maxitems THEN =""
2770 =$(Data+i%*Size)
2780 :
2790 DEF FNtotal(i%)
2800 =!(Data+i%*Size+Total)
2810 :
2820 DEF PROCsetdate(i%,d%,d$,n%)
2830 mem=Data+i%*Size+d%*4
2840 days=FNfromtext(d$)
2850 mem!Dates=days*256 OR n%
2860 ENDPROC
2870 :
2880 DEF FNfromtext(a$)
2890 LOCAL dy,mo,yr,day,year
2900 IF MID$(a$,3,1)<>" " OR MID$(a$,7,1)<>" " PRINT"Unknown date : ";a$:END
2910 dy=VALMID$(a$,1,2)
2920 yr=VALMID$(a$,8,4)
2930 mo=FNmonthnum(MID$(a$,4,3))
2940 day=dy-1+doy(mo)-(FNleap(yr) AND mo>1)
2950 IF yr=1990 THEN =day
2960 FOR year=1990 TO yr-1
2970 day=day+doy-FNleap(year)
2980 NEXT
2990 =day
3000 :
3010 DEF FNtotext(day)
3020 LOCAL dy,mo,yr,got
3030 yr=1990
3040 got=FALSE
3050 REPEAT
3060 diy=doy-FNleap(yr)
3070 IF day>=diy yr=yr+1:day=day-diy ELSE got=TRUE
3080 UNTIL got
3090 mo=12
3100 REPEAT
3110 mo=mo-1
3120 dtm=doy(mo)-(FNleap(yr) AND mo>1)
3130 UNTIL day>=dtm
3140 dy=day-dtm+1
3150 =RIGHT$("00"+STR$dy,2)+" "+MID$(mons$,mo*3+1,3)+" "+STR$yr
3160 :
3170 DEF FNleap(y)
3180 IF (y MOD 400)=0 THEN =TRUE
3190 IF (y MOD 100)=0 OR (y MOD 4)<>0 THEN =FALSE
3200 =TRUE
3210 :
3220 DEF PROCshow(first)
3230 LOCAL i
3240 i=0
3250 REPEAT
3260 PRINTTAB(0,i+3);FNline(first+i);
3270 i=i+1
3280 UNTIL i+first-1=items OR i=scrmax OR i+first-1=maxitems-1
3290 ENDPROC
3300 :
3310 DEF FNline(l%)
3320 LOCAL l$,c$
3330 l$=CHR$129+CHR$9+CHR$9+CHR$9
3340 IF l%=items l$=l$+"=>" ELSE IF l%<10 l$=l$+"f"+CHR$(48+l%) ELSE l$=l$+"  "
3350 c%=count?l%
3360 IF c%=none c$="" ELSE IF c%=0 c$="X" ELSE c$=STR$(count?l%)
3370 =LEFT$(l$+CHR$131+CHR$9+FNitem(l%)+STRING$(40," "),maxlen+9)+RIGHT$("   "+c$,3)+"  "+CHR$156
3380 :
3390 DEF PROCbar(ypos,switch)
3400 VDU 31,1,ypos+3:IF switch VDU 133,157,135 ELSE VDU 32,32,32
3410 VDU 31,7,ypos+3:IF switch VDU 135 ELSE VDU 32
3420 ENDPROC
3430 :
3440 DEF PROCedit
3450 PROCcls
3460 IF items=0 list$="NewList":PROCshowname(list$)
3470 top=0
3480 pos=0
3490 PROCshow(top)
3500 PROCbar(pos,1)
3510 REPEAT
3520 cur=top+pos
3530 IF cur=items VDU 31,8+LENFNitem(cur),3+pos:PROCcursor(1)
3540 key$=GET$
3550 PROCcursor(0)
3560 ctrl=INKEY-2
3570 oldtop=top
3580 oldpos=pos
3590 update=FALSE
3600 IF cur=items PROCendoflist ELSE PROCmidlist
3610 IF key$>=CHR$140 AND key$<=CHR$149 PROCgoto(ASCkey$-140)
3620 IF key$=CHR$138 PROCdown
3630 IF key$=CHR$139 PROCup
3640 IF update PRINTTAB(0,3+pos);FNline(cur);
3650 IF pos<>oldpos PROCbar(oldpos,0):PROCbar(pos,1)
3660 UNTIL key$=CHR$27
3670 ENDPROC
3680 :
3690 DEF PROCmidlist
3700 IF key$=CHR$13 PROCedittext
3710 IF key$>="1" AND key$<="9" PROCbuy(cur,VALkey$)
3720 IF key$="+" PROCdbuy(cur,1)
3730 IF key$="-" PROCdbuy(cur,-1)
3740 IF key$=CHR$127 PROCbuy(cur,none)
3750 IF key$="X" PROCbuy(cur,0)
3760 ENDPROC
3770 :
3780 DEF PROCendoflist
3790 IF key$=CHR$21 OR (key$>=" " AND key$<=CHR$127) PROCusekey(items,key$)
3800 IF key$=CHR$13 PROCnewitem
3810 ENDPROC
3820 :
3830 DEF PROCedittext
3840 REPEAT
3850 VDU 31,8+LENFNitem(cur),3+pos
3860 PROCcursor(1)
3870 ekey$=GET$
3880 PROCcursor(0)
3890 IF ekey$=CHR$21 OR (ekey$>=" " AND ekey$<=CHR$127) PROCusekey(cur,ekey$)
3900 UNTIL ekey$=CHR$13 AND FNitem(cur)<>""
3910 key$=""
3920 ENDPROC
3930 :
3940 DEF PROCusekey(i%,k$)
3950 s$=FNitem(i%)
3960 IF k$=CHR$127 AND s$<>"" VDU 127:s$=LEFT$(s$,LENs$-1)
3970 IF k$>=" " AND k$<CHR$127 AND LENs$<maxlen s$=s$+k$:PRINTk$;
3980 IF k$=CHR$21 PRINTSTRING$(LENs$,CHR$127);:s$=""
3990 $(Data+i%*Size)=s$
4000 ENDPROC
4010 :
4020 DEF PROCnewitem
4030 IF FNitem(items)="" ENDPROC
4040 IF items<maxitems items=items+1
4050 PROCclear(items)
4060 PROCshow(top)
4070 PROCdown
4080 dosave=TRUE
4090 ENDPROC
4100 :
4110 DEF PROCscroll(dir%)
4120 PROCbar(pos,0)
4130 VDU 28,0,scrmax+2,39,3
4140 IF dir%=1 VDU 31,0,scrmax-1,10
4150 IF dir%=-1 VDU 30,11
4160 VDU 26
4170 top=top+dir%
4180 PROCbar(pos,1)
4190 ENDPROC
4200 :
4210 DEF PROCdown
4220 IF top+pos>=items ENDPROC
4230 IF top+pos>=maxitems-1 ENDPROC
4240 IF ctrl PROCgotoend:ENDPROC
4250 IF pos<scrmax-1 pos=pos+1:ENDPROC
4260 PROCscroll(1)
4270 PRINTTAB(0,2+scrmax);FNline(top+pos);
4280 ENDPROC
4290 :
4300 DEF PROCgotoend
4310 IF items>=scrmax-1 PROCsettoppos(items-scrmax+1,scrmax-1):ENDPROC
4320 pos=items
4330 IF pos=maxitems pos=pos-1
4340 ENDPROC
4350 :
4360 DEF PROCup
4370 IF top+pos<=0 ENDPROC
4380 IF ctrl PROCsettoppos(0,0):ENDPROC
4390 IF pos<>0 pos=pos-1:ENDPROC
4400 PROCscroll(-1)
4410 PRINTTAB(0,3);FNline(top);
4420 ENDPROC
4430 :
4440 DEF PROCsettoppos(t%,p%)
4450 top=t%:pos=p%
4460 IF top<>oldtop PROCshow(top)
4470 ENDPROC
4480 :
4490 DEF PROCgoto(where)
4500 IF where>items-1 ENDPROC
4510 pos=where-top
4520 IF pos<0 PROCsettoppos(where,0)
4530 ENDPROC
4540 :
4550 DEF PROCbuy(i%,n%)
4560 count?i%=n%
4570 update=TRUE
4580 ENDPROC
4590 :
4600 DEF PROCdbuy(i%,n%)
4610 LOCAL c%
4620 c%=count?i%
4630 IF c%=none c%=0
4640 c%=c%+n%
4650 IF c%=none c%=254
4660 IF c%=0 c%=none
4670 PROCbuy(i%,c%)
4680 ENDPROC
4690 :
4700 DEF PROCsave
4710 IF items=0 ENDPROC
4720 FOR item=0 TO items-1
4730 IF count?item<>none dosave=TRUE
4740 NEXT
4750 IF dosave=FALSE ENDPROC
4760 PROCcls
4770 new$=FNlist("save",list$)
4780 IF new$="" ENDPROC
4790 out=OPENOUT(new$)
4800 CLOSE#out
4810 list$=new$
4820 PROCshowname(list$)
4830 PROCcheckout
4840 PROCsortlist
4850 PROCsavelist(list$)
4860 dosave=FALSE
4870 ENDPROC
4880 :
4890 DEF PROCcheckout
4900 FOR item=0 TO items-1
4910 IF count?item<>none PROCpurchase(item,count?item):count?item=none:sorted=FALSE:dosave=TRUE
4920 NEXT
4930 ENDPROC
4940 :
4950 DEF PROCpurchase(i%,n%)
4960 mem=Data+i%*Size
4970 mem!Total=mem!Total+n%
4980 mem=mem+Dates
4990 slot=-1
5000 REPEAT
5010 slot=slot+1
5020 entry=mem!(slot*4)
5030 UNTIL entry=0 OR (entry DIV 256)=today OR slot=maxslots
5040 IF slot=maxslots PROCshuffle(mem,maxslots):slot=maxslots-1:entry=0
5050 mem!(slot*4)=today*256 OR (n% MOD 256)
5060 ENDPROC
5070 :
5080 DEF PROCshuffle(from,words)
5090 LOCAL i%
5100 FOR i%=0 TO words-1
5110 from!(i%*4)=from!(i%*4+4)
5120 NEXT
5130 from!(i%*4)=0
5140 ENDPROC
5150 :
5160 DEF PROCsortlist
5170 IF sorted ENDPROC
5180 LOCAL i,j,k
5190 FOR i=0 TO items-1
5200 k=i
5210 FOR j=i TO items-1
5220 IF FNtotal(j)>FNtotal(k) k=j
5230 NEXT
5240 PROCswap(i,k)
5250 PROCinform("Sorting",FNitem(i))
5260 NEXT
5270 sorted=TRUE
5280 ENDPROC
5290 :
5300 DEF PROCsavelist(name$)
5310 out=OPENOUT(name$)
5320 PROCwrite("list:",">"+name$)
5330 PROCwrite("last:",today$)
5340 FOR item=0 TO items-1
5350 PROCinform("Saving",FNitem(item))
5360 BPUT#out,10
5370 PROCwrite("item:",FNitem(item))
5380 PROCwrite("total:",STR$(FNtotal(item)))
5390 mem=Data+item*Size+Dates
5400 i=0
5410 REPEAT
5420 date=mem!(i*4)
5430 IF date<>0 PROCwritedate(date)
5440 i=i+1
5450 UNTIL date=0 OR i=maxslots
5460 NEXT
5470 CLOSE #out
5480 ENDPROC
5490 :
5500 DEF PROCwritedate(d%)
5510 LOCAL date$,n%
5520 date$=FNtotext(d% DIV 256)
5530 n%=d% MOD 256
5540 IF n%<>1 date$=date$+" ("+STR$n%+")"
5550 PROCwrite("date:",date$)
5560 ENDPROC
5570 :
5580 DEF PROCwrite(f$,d$)
5590 PROCstrput(out,LEFT$(f$+STRING$(8," "),8)+d$+CHR$10)
5600 ENDPROC
5610 :
5620 DEF PROCstrput(file,str$)
5630 LOCAL i%
5640 FOR i%=1 TO LENstr$
5650 BPUT #file,ASCMID$(str$,i%,1)
5660 NEXT
5670 ENDPROC
5680 :
5690 DEF PROCprint(a$)
5700 IF tofile PROCstrput(out,a$+CHR$10):ENDPROC
5710 PRINTa$
5720 ENDPROC
5730 :
5740 DEF PROClist
5750 IF items=0 ENDPROC
5760 PROCcls
5770 to$=FNlist("save","SL"+LEFT$(today$,2)+RIGHT$("00"+STR$(1+FNmonthnum(MID$(today$,4,3))),2))
5780 PROCcheckout
5790 VDU 28,0,23,39,2,12
5800 tofile=TRUE
5810 low$=FNlow(to$)
5820 IF low$="vdu:" OR low$="" tofile=FALSE
5830 IF low$="printer:" tofile=FALSE:VDU 2
5840 IF tofile out=OPENOUT(to$)
5850 PROCprint(list$+" shopping list on "+today$+CHR$10)
5860 FOR item=0 TO items-1
5870 dates=0
5880 FOR slot=0 TO maxslots-1
5890 entry=Data!(item*Size+Dates+slot*4)
5900 date(slot)=entry DIV 256
5910 num(slot)=entry MOD 256
5920 IF entry<>0 dates=dates+1
5930 NEXT
5940 IF dates>1 PROCcalculate
5950 NEXT
5960 VDU 3
5970 IF tofile CLOSE#out ELSE PRINT'"Press any key to continue":IFGET
5980 VDU 12,26
5990 ENDPROC
6000 :
6010 DEF PROCcalculate
6020 IF dates=0 ENDPROC
6030 period=date(dates)-date(0)
6040 i=dates-1
6050 used=0
6060 REPEAT
6070 IF i>=0 used=used+num(i)
6080 i=i-1
6090 UNTIL i<0
6100 IF used=0 ENDPROC
6110 last=num(dates)
6120 IF last=0 last=1
6130 i=dates
6140 REPEAT
6150 IF num(i)=0 i=i-1
6160 UNTIL num(i)<>0
6170 timegap=(date(i)-date(0))/i
6180 IF last*period/used+date(dates)<today+timegap/2 PROCprint(" "+FNitem(item))
6190 ENDPROC
```



Pieces of Eight

Listing 1

```
10 REM SVPicSrc (Po81)
20 REM by David Acton/Bruce Smith
30 REM For B/B+/M/E
40 REM (C) BAU Sep 91
50 :
60 PROCassemble
70 PROCchecksum
80 *SAVE SVPIC 2E00 2FFF
90 END
100 :
110 DEF PROCassemble
120 FOR pass=0 TO 3 STEP 3
130 P%=&2E00
140 [OPT pass
150 STY &84
160 LDA #&01
170 STA &83
180 LDA #&02
190 STA &82
200 JSR writecat
210 LDA #&00
220 STA &83
230 LDA #&FF
240 STA &86
250 STA &87
260 LDA #&01
270 STA &82
280 .restart
290 LDA #&02
300 STA &88
310 LDA #&03
320 STA &79
330 .redo
340 LDA #&00
350 STA &80
360 STA &81
370 JSR subone
380 LDA &81
390 CMP &87
400 BCC forward10
410 BNE roll
420 LDA &80
430 CMP &86
440 BCS roll
450 .forward10
460 LDA &80
470 STA &86
480 LDA &81
490 STA &87
500 LDA &82
510 STA &85
520 LDA &88
530 STA &89
540 LDA &79
550 STA &8A
560 .roll
570 SEC
580 ROL &79
590 INC &88
600 LDA &88
610 CMP #&09
620 BNE redo
630 INC &82
640 LDA &82
650 CMP #&09
660 BNE restart
670 LDA #&01
680 STA &83
690 LDA &85
700 STA &82
710 LDX #&08
720 STX &73
730 JSR transfer
740 LDX #&08
750 LDA &89
760 STA &88
770 JSR transfer
780 LDA &8A
790 STA &79
800 JSR subone
810 JMP subtwo
820 .subone
830 LDA &82
840 STA &7E
850 SEC
860 SBC #&01
870 STA &7F
880 .doall
890 JSR copy
900 LDA &7F
910 STA &70
920 .allagain
930 LDY #&00
940 LDA (&70),Y
950 LDY &7E
960 CMP (&70),Y
970 BEQ over16
980 CLC
990 JSR subthree
1000 LDX &7A
1010 LDY #&00
1020 LDA (&70),Y
1030 JSR transfer
1040 JMP forward
1050 .over16
1060 STA &78
1070 LDY #&00
1080 STY &77
1090 .back11
1100 INC &77
1110 JSR addthem
1120 BMI setcarry
1130 LDA &77
1140 CMP &79
1150 BEQ setcarry
1160 LDA (&70),Y
1170 CMP &78
1180 BEQ back11
1190 .setcarry
1200 SEC
1210 JSR subthree
1220 LDA &77
1230 LDX &88
1240 JSR transfer
1250 LDA &78
1260 LDX &7A
1270 JSR transfer
1280 LDA &70
1290 SEC
1300 SBC &7E
1310 STA &70
1320 LDA &71
1330 SBC #&00
1340 STA &71
1350 .forward
1360 JSR addthem
1370 BPL allagain
1380 DEC &7F
1390 BPL doall
1400 RTS
1410 .subtwo
1420 LDX #&08
1430 LDA #&00
1440 JSR transfer
1450 LDA #&00
1460 LDY &75
1470 JMP &FFCE
1480 .subthree
1490 ROL &74
1500 DEC &73
1510 BNE return
1520 INC &80
1530 BNE nohigh
1540 INC &81
1550 .nohigh
1560 LDA &83
1570 BEQ noput
1580 LDY &75
1590 LDA &74
1600 JSR &FFD4
1610 .noput
1620 LDA #&08
1630 STA &73
1640 .return
1650 RTS
1660 .transfer
1670 LSR A
1680 PHA
1690 JSR subthree
1700 PLA
1710 DEX
1720 BNE transfer
1730 RTS
1740 .copy
1750 LDA &7C
1760 STA &70
1770 LDA &7D
1780 STA &71
1790 RTS
1800 .addthem
1810 LDA &70
1820 CLC
1830 ADC &7E
1840 STA &70
1850 LDA &71
1860 ADC #&00
1870 STA &71
1880 RTS
1890 .writecat
1900 LDA &84
1910 CLC
1920 ADC &F2
1930 TAX
1940 LDA &F3
1950 ADC #&00
1960 TAY
1970 LDA #&80
1980 JSR &FFCE
1990 STA &75
2000 LDA #&08
2010 STA &73
2020 LDA #&84
2030 LDX #&00
2040 LDY #&00
2050 JSR &FFF4
2060 STX &7C
2070 STY &7D
2080 JSR copy
2090 LDY #&00
2100 LDX #&01
2110 STX &7A
2120 STX &7F
2130 .back10
2140 STX &7E
2150 LDA &7A
2160 CMP (&70),Y
2170 BCS over8
2180 SEC
2190 ROL &7A
2200 INX
2210 BNE back10
2220 .over8
2230 JSR addthem
2240 BPL back10
2250 STX &7A
2260 LDX #&08
2270 LDA &7A
2280 JSR transfer
2290 LDX #&55
2300 LDY #&00
2310 LDA #&A0
2320 JSR &FFF4
2330 TXA
2340 LDX #&08
2350 JSR transfer
2360 LDX #&0F
2370 .back17
2380 TXA
2390 STA &8B
2400 PHA
2410 LDX #&8B
2420 LDY #&00
2430 LDA #&0B
2440 JSR &FFF1
2450 LDA &8C
2460 LDX #&04
2470 JSR transfer
2480 PLA
2490 TAX
2500 DEX
2510 BPL back17
2520 RTS
2530 ]
2540 NEXT
2550 ENDPROC
2560 :
2570 DEF PROCchecksum
2580 C%=0
2590 FOR X%=&2E00 TO &2FAE
2600 C%=C%+?X%
2610 NEXT
2620 IF C%=50668 THEN ENDPROC
2630 VDU 7
2640 PRINT"Checksum error!"
2650 END
```

Listing 2

```
10 REM LDPicSrc (Po82)
20 REM by David Acton/Bruce Smith
30 REM for B/B+/M/E0
40 REM (c) BAU Sep 91
50 :
60 PROCvars
70 PROCassemble
80 PROCchecksum
90 *SAVE Ldpic 2E00 2F35
100 END
110 :
120 DEF PROCvars
130 osbyte=&FFF4:osfind=&FFCE
140 oswrch=&FFEE:osbget=&FFD7
150 ENDPROC
160 :
170 DEF PROCassemble
180 FOR pass=0 TO 3 STEP 3
190 P%=&2E00
200 [OPT pass
210 LDA #&06
220 CLC
230 ADC &F2
240 TAX
250 LDA &F3
260 ADC #&00
270 TAY
280 LDA #&40
290 JSR osfind
300 CMP #&00
310 BNE noerror
320 BRK
330 ]
340 ?P%=&D6:P%=P%+1
350 $P%="No Screen File"
360 P%=P%+LEN($P%)
370 [OPT pass
380 BRK
390 .noerror
400 STA &75
410 LDA #&01
420 STA &73
430 LDX #&08
440 JSR subroutine1
450 STA &7A
460 LDX #&08
470 JSR subroutine1
480 STA &7B
490 LDA #&A0
500 LDX #&55
510 JSR osbyte
520 TXA
530 CMP &7B
540 BEQ nochange
550 LDA #&16
560 JSR oswrch
570 LDA &7B
580 JSR oswrch
590 LDX #&09
600 .nextbyte
610 LDA buffer,X
620 JSR oswrch
630 DEX
640 BPL nextbyte
650 .nochange
660 LDA #&84
670 LDX #&00
680 LDY #&00
690 JSR osbyte
700 STX &7C
710 STY &7D
720 LDX #&0F
730 .loop
740 LDA #&13
750 JSR oswrch
760 TXA
770 PHA
780 JSR oswrch
790 LDX #&04
800 JSR subroutine1
810 JSR oswrch
820 LDA #&00
830 JSR oswrch
840 JSR oswrch
850 JSR oswrch
860 PLA
870 TAX
880 DEX
890 BPL loop
900 LDX #&08
910 JSR subroutine1
920 STA &7E
930 LDX #&08
940 JSR subroutine1
950 STA &88
960 LDA &7E
970 STA &7F
980 .redo
990 JSR swap
1000 LDA &7F
1010 SEC
1020 SBC #&01
1030 STA &70
1040 .rightback
1050 JSR subroutine2
1060 BCC forward
1070 LDX &88
1080 JSR subroutine1
1090 STA &77
1100 LDX &7A
1110 JSR subroutine1
1120 STA &78
1130 LDY #&00
1140 .goback
1150 LDA &78
1160 STA (&70),Y
1170 JSR addmove
1180 DEC &77
1190 BNE goback
1200 JMP ahead
1210 .forward
1220 LDX &7A
1230 JSR subroutine1
1240 LDY #&00
1250 STA (&70),Y
1260 JSR addmove
1270 .ahead
1280 LDA &71
1290 BPL rightback
1300 DEC &7F
1310 BEQ carryon
1320 JMP redo
1330 .carryon
1340 LDA #&00
1350 LDY &75
1360 JMP osfind
1370 .subroutine2
1380 DEC &73
1390 BNE noget
1400 LDY &75
1410 JSR osbget
1420 STA &74
1430 LDA #&08
1440 STA &73
1450 .noget
1460 ASL &74
1470 RTS
1480 .subroutine1
1490 STX &79
1500 LDA #&08
1510 SEC
1520 SBC &79
1530 STA &79
1540 LDA #&00
1550 STA &76
1560 .nextbit
1570 JSR subroutine2
1580 ROR &76
1590 DEX
1600 BNE nextbit
1610 LDX &79
1620 BEQ return
1630 .trynext
1640 CLC
1650 ROR &76
```

```
1660 DEX
1670 BNE trynext
1680 .return
1690 LDA &76
1700 RTS
1710 .swap
1720 LDA &7C
1730 STA &70
1740 LDA &7D
1750 STA &71
1760 RTS
1770 .addmove
1780 LDA &70
1790 CLC
1800 ADC &7E
1810 STA &70
1820 LDA &71
1830 ADC #&00
1840 STA &71
1850 RTS
1860 .buffer
1870 ]
1880 NEXT
1890 ENDPROC
1900 :
1910 DEF PROCchecksum
1920 C%=0
1930 FOR X%=&2E00 TO &2F32
1940 C%=C%+?X%
1950 NEXT
1960 IF C%=37790 THEN ENDPROC
1970 VDU 7
1980 PRINT"Checksum error!"
1990 STOP
```

Listing 3

```
10 REM Mode Convertor (Po83)
20 REM by Phil Wilkes
30 REM for B/B+/M/E
40 REM (c) BAU Sep 91
50 :
60 MODE 4
70 PROCtables
80 PROCcode
90 PROCchecksum
100 PROCsave
110 END
120 :
130 DEF PROCtables
140 even10%=&1600
150 even20%=&1800
160 even21%=&1880
170 odd10%=&1700
180 odd20%=&1840
190 odd21%=&18C0
200 pointer%=&70
210 PRINTTAB(0,10)"Please wait - creat
ing conversion tables"
220 mask%=&88
230 FOR screen%=0 TO 255
240 S%=screen%
250 D%=0
260 E%=0
270 FOR pix%=0 TO 3
280 C%=S% AND mask%
290 IF C%=136 THEN D%=D%+3:E%=E%+3
300 IF C%=128 AND (pix% MOD 2)=1 THEN
D%=D%+1:E%=E%+3
310 IF C%=128 AND (pix% MOD 2)=0 THEN
D%=D%+3:E%=E%+1
320 IF C%=8 THEN D%=D%+1::E%=E%+2
330 IF pix%<3 THEN S%=S%*2:D%=D%*4:E%=
E%*4
340 NEXT pix%
350 even10%?screen%=E%
360 odd10%?screen%=D%
370 NEXT screen%
380 mask%=42
390 FOR screen%=0 TO 63
400 S%=screen%
410 D%=0
420 E%=0
430 FOR pix%=0 TO 1
440 C%=S% AND mask%
450 IF C%=42 THEN D%=D%+15:E%=E%+15
460 IF C%=10 THEN D%=D%+7:E%=E%+15
470 IF C%=40 THEN D%=D%+7:E%=E%+13
480 IF C%=8 THEN D%=D%+7:E%=E%+13
490 IF C%=34 THEN D%=D%+10:E%=E%+5
500 IF C%=2 THEN D%=D%+10:E%=E%+5
510 IF C%=32 THEN D%=D%+8:E%=E%+2
520 IF pix%=0 THEN S%=S%*2:E%=E%*16:D%
=D%*16
530 NEXT pix%
540 even20%?screen%=E%
550 odd20%?screen%=D%
560 NEXT screen%
570 FOR screen%=0 TO 63
580 S%=screen%
590 D%=0
600 E%=0
610 FOR pix%=0 TO 1
620 C%=S% AND mask%
630 IF C%=42 THEN D%=D%+51:E%=E%+51
640 IF C%=10 THEN D%=D%+49:E%=E%+50
650 IF C%=40 THEN D%=D%+48:E%=E%+48
660 IF C%=8 THEN D%=D%+16:E%=E%+32
670 IF C%=34 THEN D%=D%+18:E%=E%+33
680 IF C%=2 THEN D%=D%+3:E%=E%+3
690 IF C%=32 THEN D%=D%+1:E%=E%+2
700 IF pix%=0 THEN S%=S%*2:E%=E%*4:D%=
D%*4
710 NEXT pix%
720 even21%?screen%=E%
730 odd21%?screen%=D%
740 NEXT screen%
750 ENDPROC
760 :
770 DEF PROCcode
780 P%=&1500
790 [
800 .ch10
810 LDA #0
820 STA pointer%
830 TAX
840 LDA #&30
850 STA pointer%+1
860 .loop
870 LDA (pointer%,X)
880 TAY
890 LDA even10%,Y
900 STA (pointer%,X)
910 INC pointer%
920 LDA (pointer%,X)
930 TAY
940 LDA odd10%,Y
950 STA (pointer%,X)
960 INC pointer%
970 BNE loop
980 INC pointer%+1
990 BPL loop
1000 RTS
1010 .ch20
1020 LDA #0
1030 STA pointer%
1040 TAX
1050 LDA #&30
1060 STA pointer%+1
1070 .loop2
1080 LDA (pointer%,X)
1090 AND #63
1100 TAY
1110 LDA even20%,Y
1120 STA (pointer%,X)
1130 INC pointer%
1140 LDA (pointer%,X)
1150 AND #63
1160 TAY
1170 LDA odd20%,Y
1180 STA (pointer%,X)
1190 INC pointer%
1200 BNE loop2
1210 INC pointer%+1
1220 BPL loop2
1230 RTS
1240 .ch21
1250 LDA #0
1260 STA pointer%
1270 TAX
1280 LDA #&30
1290 STA pointer%+1
1300 .loop1
1310 LDA (pointer%,X)
1320 AND #63
1330 TAY
1340 LDA even21%,Y
1350 STA (pointer%,X)
1360 INC pointer%
1370 LDA (pointer%,X)
1380 AND #63
1390 TAY
1400 LDA odd21%,Y
1410 STA (pointer%,X)
1420 INC pointer%
1430 BNE loop1
1440 INC pointer%+1
1450 BPL loop1
1460 RTS
1470 ]
1480 ENDPROC
1490 :
1500 DEF PROCchecksum
1510 total%=0
1520 FOR i%=&1500 TO P%-1
1530 total%=total%+?i%
1540 NEXT i%
1550 IF total%<>14701 PRINT"Checksum er
ror in assembler.":VDU7:END
1560 total%=0
1570 FOR i%=&1600 TO &18FF
1580 total%=total%+?i%
1590 NEXT i%
1600 IF total%<>104872 PRINT"Checksum e
rror in tables.":VDU7:END
1610 ENDPROC
1620 :
1630 DEF PROCsave
1640 *SAVE CONVERT 1500 1900
1650 ENDPROC
```

Notes

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I-GRABBING

ROB MILLER tries out Techno-I, the Arc podule that grabs your graphics for you

A computer such as the Archimedes is ideally suited to those applications that need high-resolution colour graphics. The only real drawback is the considerable time needed to design detailed and colourful graphics for programs of this sort.

With colour printing technology in a reasonably advanced state, it is now also possible to include full colour diagrams and pictures in documents, via desktop publishing programs such as *Impression 2*. The results can be excellent; just look at the articles in this magazine for proof.

With the addition of a single podule to convert the incoming video signal into a machine recognisable form, the Archimedes can be used to 'grab' pictures from a video recorder or camera, and then display them or save them as sprites.



TECHNO-I: FULL SOFTWARE CONTROL

Techno-I from Technomatic Ltd, is the latest colour digitiser for the Archimedes. The package consists of a single-width podule (boxed for the A3000), a disc containing the driver software and a comprehensive manual.

Fitting the Techno-I podule is simply a case of removing the lid from the Archimedes, pushing the podule into an empty slot on the backplane and replacing the machine's lid. For A300 series owners, a backplane will be required if not already fitted to the computer. A special version of the Techno-I podule has been designed for A3000 owners. This comes in its own case and slots into the expansion slot on the back of the computer.

Techno-I will take a number of different sources, including a standard VCR or video camera. These are connected via a standard BNC socket.

An S-VHS upgrade is available (£119.85 inc. VAT) for the podule which allows S-VHS-compatible equipment, such as the Canon Ion Videostill camera, to be used for better picture quality. No connecting cables are provided with the package so it's worth checking with Technomatic which sort of cable will be best suited to your requirements.

Once the board is fitted and the software loaded, digitising can begin. Two Risc OS applications are provided on the accompanying disc.

!Telly allows you to monitor the incoming video signal via an on-screen viewfinder. The viewfinder can be either 1/16 or 1/4 screensize. Both ratios give a recognisable picture, but the former runs faster.

Any desktop mode can be used and 256-colour modes will give a 'colour' picture in the view-finder. Although picture quality improves with resolution, the speed at which the viewfinder is updated is greatly reduced, making Mode 15 a good compromise.

Full software control over the brightness, contrast and colour levels is provided via slider controls. Gamma correction – correcting the luminance transfer characteristic of a video system – can be applied to the picture to preserve the original luminance.

The main application on the disc, *Techno-I*, provides tools to grab and process video pictures. Installing the software is simply a case of double-clicking on the *Techno-I* icon. A 1/16 screensize viewfinder similar to the *!Telly* application is displayed.

Unlike *!Telly*, the *Techno-I* application will only work in 256-colour modes. If an attempt is made to run the application in, for example, Mode 12, the menu-bar icon is crossed out to show that the current mode is unsuitable.

The size to which pictures are converted can be set to anything from 1 x 1 to 1280 x 1024 pixels. The screen mode of the resulting sprite is set automatically by Techno-I; anything higher than 256 pixels vertically is taken to be aimed at a multisync display.

Grabbing a picture is just a case of waiting until the viewfinder displays the required image and then quickly clicking on the Digitise icon. Troubke is, if you're using a moving picture source, timing when to click the mouse button can take a bit of practice.

Setting up and using the Techno-I hardware and software is simplicity itself. The built-in test routines allow anyone non-technical to make sure they have the system set up correctly. All the software complies to Risc OS guide lines so anyone already familiar with the desktop environment should be able to use it.

The quality of picture is as good as that from any other colour digitiser on the market. The best results are obtained if you use a multisync monitor because at such a high resolution, the colour dithering works particularly well.

One problem that did arise was a slight disagreement between the podule and the backplane fitted to the A440/1 being used for the review. The way in which Techno-I communicates through the IIC interface can corrupt the Archimedes Cmos Ram settings, making the machine impossible to use. This only happened occasionally and Technomatic promises to replace any boards that have the compatibility problem.

One final niggle; the metal work on the podule was decidely second-rate. The screw holes didn't line up correctly with the Arc's casing, and the brackets connecting the metal work to the podule were rather flimsy. A few more pounds could have been spent in improving this.

The package is surprisingly good value compared to the rest of the field. The podule takes up only one podule slot, whereas most other colour digitisers take two.

PRODUCT DETAILS

Techno-I is from Technomatic, 468 Church Lane, London NW9 8UF Tel: 081-205 9558, at £292.58 on the Arc, £327.83 on the A3000.

Archimedes Software

E & OE

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MultiFS

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MultiFS Features





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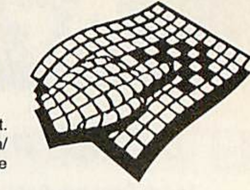
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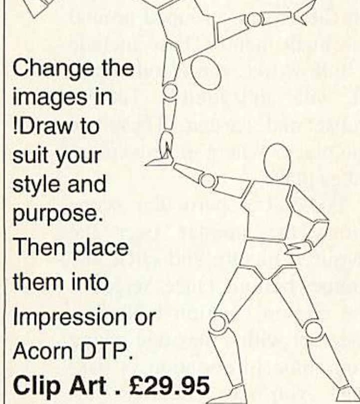


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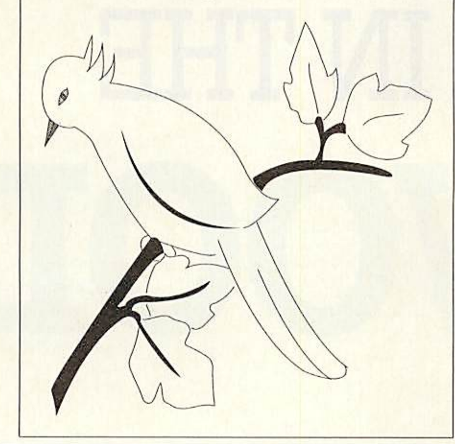
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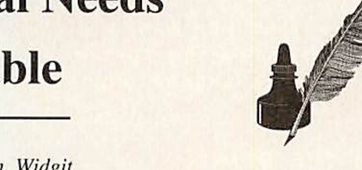
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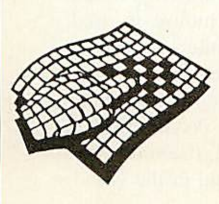
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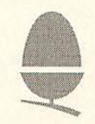
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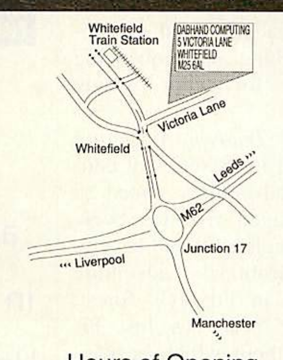
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HOOD IN THE WOOD

DAVE FUTCHER believes that adventure games have a definite place in the classroom and in home education. Here he looks at two new adventures for children aged five to seven

Adventure games generally involve children taking an active role in a story, where clues have to be followed and problems solved before the adventurer can progress to the next stage. They are very rewarding in that they provide a wealth of stimuli across the curriculum – encouraging reading, thinking and planning.

Selective Software has a history of providing simple yet effective educational adventure games for the eight-bit computer, including programs for infant, junior and lower secondary school pupils, all of which have proved popular both in schools and at home. Topologika has also built quite a name for itself as publishers of educational adventure games with popular packages such as *Giantkiller*, the widely used mathematical adventure, as well as being responsible for classic material like *Countdown to Doom* by Peter Kilworth.

TEDDY BEARS' PICNIC

The character of Freddy Teddy first appeared for the Archimedes and A3000 in a package of three programs, which Topologika published to support matching and sequencing activities for very young children.

Freddy Teddy's Adventure is the first in its series of educational adventures aimed at children aged five to seven. This is a colourful and easy to use educational adventure game set in Freddy's forest. The little bear has lost his honey without which he cannot go to the picnic, and the child's task is to help him find it. The child also has to help Freddy find some nuts, a clock and an invitation.

The adventure is started by clicking on the Teddy icon in the directory viewer. The program is not multi-tasking but it fully utilises the icons, mouse and pointer, encouraging the child to explore the full potential of the machine.

THE BEARS OFFER AN INCENTIVE

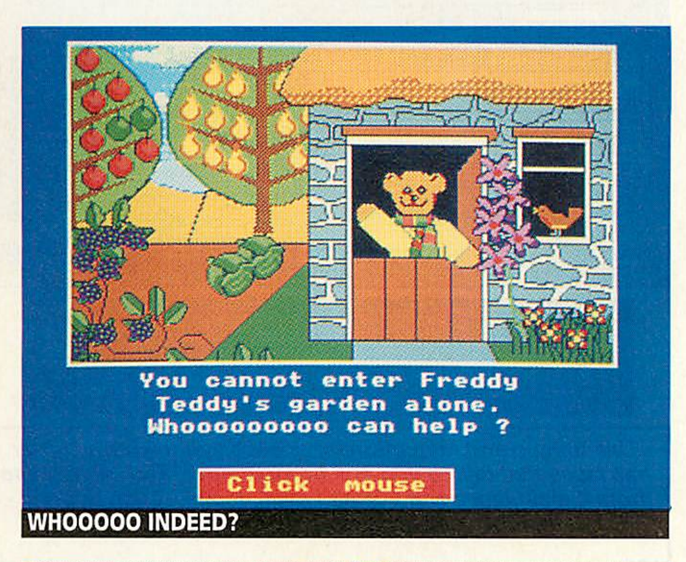
At the start of the adventure a number of scenes are shown on the screen, grouped around the main menu. These include a hollow tree, the wood, a picnic site and Freddy Teddy's house and garden. These are the places where the adventure takes place.

To visit a particular scene move the pointer over the required picture and click any mouse button. Once selected, the chosen location is shown, together with a message giving you some information or asking you to search for something at the site. Many of the pictures provided are interactive and as you click on them further messages appear. This is particularly effective for searching tasks, which constitute a major element of *Freddy Teddy's Adventure*.

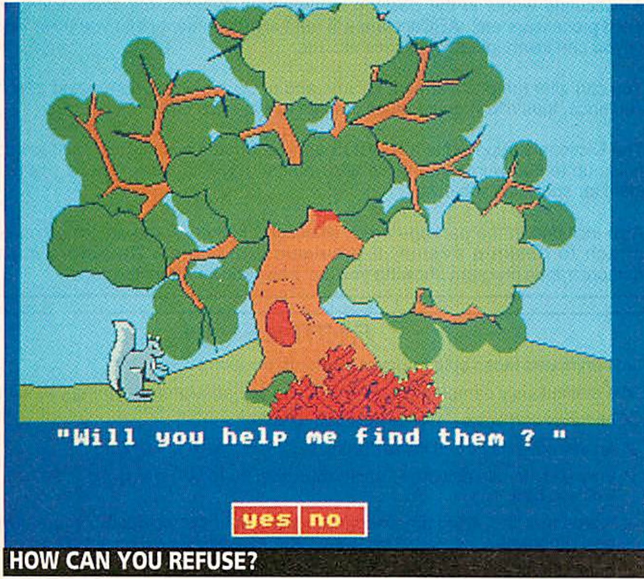
In one scene the squirrel has lost his winter store of nuts somewhere in the large tree, and Freddy Teddy has to help him search for them. There are all sorts of things to be found – a click on one branch brings up a bird's nest with a parent feeding its young. Eventually the nuts are found in a hollow in the trunk.

As well as searching for specified objects some scenes have puzzles to solve, while others include counting and memorizing objects. In a forest clearing the bears have to be counted as they appear on screen so that the correct number of sandwiches can be made. Furthermore some scenes cannot be visited until certain clues have been collected or other places have been visited.

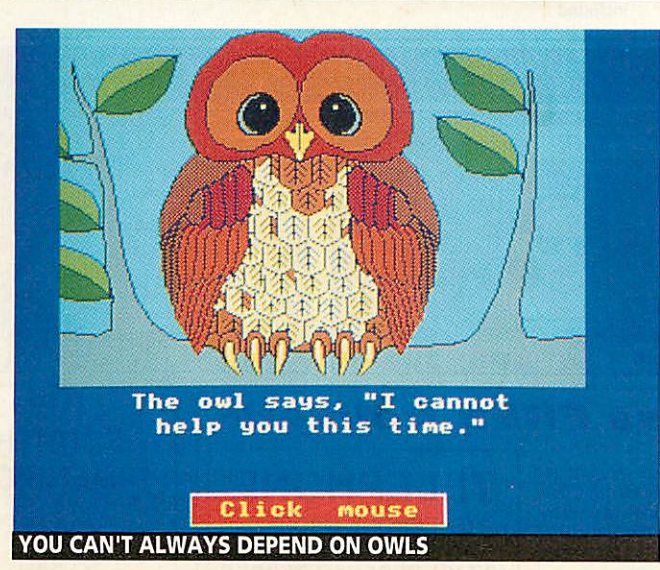
Interestingly the authors have added the dimension of time to the game. This is simulated by incrementing a counter by a random amount each time the mouse is used. When the counter exceeds a program defined value, darkness will fall before the picnic can take place. As all children will understand, bears don't go searching around in the woods late at night!



WHOOOOO INDEED?



HOW CAN YOU REFUSE?



YOU CAN'T ALWAYS DEPEND ON OWLS

Little Red Riding Hood first appeared for the BBC, and now makes a welcome appearance in an improved package for the A3000. Although well executed with excellent graphics, and music developed with *Tracker*, the program really fails to harness the power of the A3000. Why does it use double-sized text, ignoring the potential of outline fonts? However, as an educational program it still has a great deal to offer.

It is an adventure in two separate parts. The first section follows Red Riding Hood as she travels through the forest to her grandma's house. This is not as easy as it at first appears – it is a linear journey on which the children using the program are expected to solve simple problems.

These puzzles generally have a mathematical content, and involve the children collecting a number of objects and remembering some of the things they are told by the various creatures they meet.

The forest is a magical place where plants, animals and other creatures take on a life of their own. Eventually they meet the wolf! Clever graphics and some basic animation make the child feel it is actually happening, but by using something collected on the way the wolf is frightened away and grandma's cottage is finally reached.

The second part of *Little Red Riding Hood* follows the story on from the cottage. Grandma has wandered off into the forest and Red Riding Hood has to go looking for her. After a while a bluebird appears to tell her that her grandma has been taken by the Giant to his castle.

This part of the program is more of a true adventure type program where the child is given a choice of movement between a number of locations on an on-screen map using the mouse and pointer. The objective is to help Red Riding Hood search for her grandma.

Along the way objects have to be collected and used. For instance, the child has to find a coin to throw into the well for good luck, and a rope to cross the broken bridge. Simple record keeping and map reading skills are also required in this part of the program.

From each location children can only move to an adjacent location connected by a foot path. A clever touch is that a box appears around those areas to which movement is allowed, and the pointer will not move out of the box.

Little Red Riding Hood is a highly motivating program, suitable for children of infant school age.

CONCLUSION

These packages are ideal for anyone with young children. *Freddy Teddy's Adventure* comes with a beautifully produced reading book, full of recognition and counting tasks, while *Little Red Riding Hood* includes an extensive manual with a large number of tasks to follow up.

Both programs successfully create imaginary worlds that young children easily identify with, aimed at such a level that they can be explored without adult supervision.

The puzzles and tasks are not too difficult and most importantly the programs foster much discussion and conversation. Once they have encountered these programs children will want to play them again and again.

PRODUCT DETAILS

Freddy Teddy's Adventure costs £19.95 and is published by Topologika, PO Box 39, Stilton, Peterborough, PE7 3RL. Tel: (0733) 244682.

Little Red Riding Hood costs £15 and is published by Selective Software, 64 Brooks Road, Street, Somerset, BA16 0PP. Tel: (0458) 43079.

Both are available for the BBC A3000 and Archimedes.

ACROSS THE GREAT DIVIDE

DAVE LAWRENCE takes a close look at Cross32 – is it the last word in assemblers?

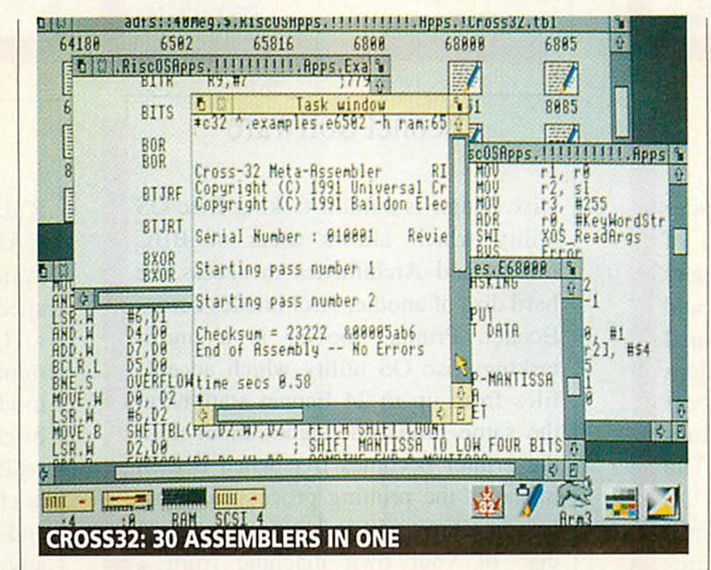
Until now, the Archimedes machine code programmer has had a choice of two assemblers; you could either use the one built in to Basic 5 or lash out 150 quid and use Acorn's own macro assembler *Aasm*. You can't easily assemble large programs with the Basic assembler, it won't warn you if you define a label twice and it has no real macros.

Aasm is a 'proper' assembler and therefore has better error checking, real macros and, most importantly, the ability to link source files together and assemble very large amounts of code. On the whole the built-in Basic assembler is quite adequate for most jobs – *Aasm* need only be used by the most ardent of code hackers.

Unfortunately *Aasm* is far from perfect, so I eagerly awaited the arrival of Baildon Electronics' *Cross32* which Ian Copestake Software has been advertising for the last few months. Described as a 'professional table-based cross-assembler' it is something more than jusr a simple Arm assembler.

Instead of being tied to one 'target' processor it is capable of assembling code for just about any chip. You need only a so called 'processor table' for the cpu you are using. Tables for over 30 chips are supplied (including Arm, 6502, Z80, 68000, 8086) and it is a relatively simply task to add new ones.

Access to the chip's data sheet and a day or so of spare time should be quite sufficient. Theoretically it would be possible to build a table containing 6502 mnemonics referenced to Arm opcodes, you could then test out your code at breakneck speed on an Archimedes.



CROSS32: 30 ASSEMBLERS IN ONE

The assembler itself is run from the command line by typing c32 source -H object. A Risc OS front end is provided for desktop people. This consists of an icon on the icon bar. If a file is dropped on this, it will be assembled in a 'single task window', meaning the assembler does not multi-task. If you desperately need it to, then you can run it from within an *Edit* task window.

As with *Aasm* you can prepare your source file in any text editor, I use *Twin* but you can use *Edit, First Word Plus, Pipedream* or even *Impression* if you want. There is very little else to say about the actual process of assembling; it works, and it works at a very respectable speed. I've successfully converted a large BBC machine code program into *Cross32* format and it assembles perfectly.

If you are using an Archimedes as a development system and regularly need to produce code for 'alien' processors, *Cross32* is a wonderful tool; the problem is if you are hoping to move over to *Cross32* from *Aasm* or the Basic assembler.

As *Cross32* was originally written on a PC, there are many features and facilities sadly missing. You cannot use & to represent hex numbers; expressions use curly brackets instead of parentheses; you cannot import binary files, meaning data. My *Aasm* can't do this either though – so three cheers for Basic!

You cannot automatically set the file type or the load and execution addresses of the final file (a datafile is produced). The directives used for data storage are non-Acorn standard and are not consistent (for example, DFB for EQUB, DLL for EQUD!).

More seriously, there is no automatic method of using a register to access a block of store (*Aasm*'s ^ directive); you cannot nest macro calls, there are no local labels; you cannot produce code to be used by a linker (Acorn's *ObjAasm* will do this); no cross-referencing infomation and no looping structures of any sort.

Due to the nature of the processor tables it cannot detect certain illegal Arm instructions such as MUL r0,r0,r1. These it will assemble quite happily and then will leave you to figure out just why your code doesn't work.

If you are starting a program from scratch, you could take all these things into account – even the rather serious omissions. However, as an Arm assembler, there is not nearly enough of the functionality of *Aasm* to make it a full replacement. As a cross assembler, though, it's probably miles better than any alternatives.

You may not believe there is any good news, but there is! The authors are currently in the planning stage of version 2 and with any luck, most, if not all of the above criticisms will be removed.

At £175 it represents amazing value for money as you're getting at least 30 assemblers for the price of one. It's just a great shame there are so many omissions. Perhaps if there had been another couple of weeks of field testing, *Cross32* would have been the last word in assemblers. Unless you're desperate for a cross assembler, I'd wait a while for version 2, especially if you want to develop Arm code.

PRODUCT DETAILS

Cross32 on Archimedes disc costs £175 from Ian Copestake Software, 10 Frost Drive, Wirral, Merseyside L61 4XL.

Computer Aided Draughting

Worra CAD is the first CAD system written for the RISC OS Desktop environment. It is a 2D package designed to help the user to produce top quality technical drawings. By taking all the hard work out of creating geometric constructions such as tangents and blended arcs, and by automatically generating dimensions and linestyles, WorraCAD speeds the drawing process and allows high precision output to Plotters and to RISC OS Printer Drivers as well as a wide range of other RISC OS packages (e.g. DTP, Euclid etc.)

WorraCAD £99.00

OAK SOLUTIONS

BASIC Compiler

The ABC BASIC Compiler is widely regarded by those 'in the know' as the most professional BASIC compiler available for the Archimedes. That's why there are more commercially available packages compiled with ABC than with any other BASIC compiler. Compilation takes place as a RISC OS task. Version 3 has support for the creation of relocatable modules. Modules containing libraries of procedures and functions can be created and called from any other program compiled with ABC (including Genesis II).

ABC Compiler £69.00

OAK SOLUTIONS

A3000 RAM Upgrades

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4Mb £199.00



Pascal Compiler

The Cambridge Pascal compiler supports a comprehensive version of the Pascal language and includes many extra features such as full string and local error handling. Additional extensions allow the use of random access files and provide direct access to the operating system routines including star commands. The compiler runs under the RISC OS Desktop. Cambridge Pascal comes complete with a library of procedures and functions which support access to the window manager.

Cambridge Pascal £69.00



Econet Software

Disc Sharer is a multi-tasking Risc OS utility which allows users of BBC micros and Archimedes to access the hard disc of another Archimedes across Econet. Printer Spooler is a multi-tasking Risc OS utility which accepts files from up to 24 Econet stations at the same time and queues them until the printer becomes free when it then manages the printing process. Remote Logon allows you to log onto the hard disc of your own machine from a remote machine across Econet with full password protection.

Disc Sharer £137.50
Printer Spooler £81.25
Remote Logon £38.00



Primary 3D CAD

KiddiCAD is a revolutionary new 3D CAD system. Unlike other 3D systems, KiddiCAD has been designed specifically for use by children in the 5 to 14 age range. KiddiCAD works by mimicking the use of building bricks - models are simply created by placing bricks on top of one another in a realtime 3D perspective view. It really is childsplay. 256 colours can be used, and KiddiCAD can output sprites in any mode for transfer into art packages, Genesis, DTP systems etc., and prints via the standard RISC OS printer drivers.

KiddiCAD £99.00

OAK SOLUTIONS

A3000 User/Analogue/Disc

At last, a professional range of User Port upgrades for the A3000. Our internal expansion podules are available in three varieties. The entry level model provides a fully functional BBC user port, supported with fully 'Acorn Legal' software - ideal for use with the Concept Keyboard. The next model in the range has a BBC analogue port in addition to the user port, and the top model in the range has both these ports as well as a floppy disc buffer interface to allow extra floppy disc drives to be added.

User Port £45.00
User/Analogue £54.00
User/Analog/Disc £65.00



Plotter Driver for Drawfiles

This Risc OS utility allows users of !Draw (and other software that produces drawfiles) to output drawings to HPGL compatible plotters. By simply dragging a drawfile onto the Worra Plotter icon on the icon bar, it will be output as HPGL commands to the selected destination. Pen speed, plotter size and pen configuration may be selected from within Worra Plotter. Worra Plotter will render all CAD type objects and will render text objects in the plotter's own font. Sprites, line thickness, fills and text column objects are ignored.

Worra Plotter £29.95

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CONGENIAL CODING

JIM EULER ponders Acorn's friendly new Desktop Development Environment. Will it define the shape of code to come?

Up until now the only real way to write complex and speedy 32-bit applications was with the cumbersome *ANSI C Release 3*, or the even more cumbersome *Acorn Assembler*. Compiled Basic was a realistic alternative option to these two.

Now, after four person-years of work, Acorn is ready to release the Desktop Development Environment. The two new products, *Acorn C release 4* and *Assembler release 2*, will replace *Acorn C release 3* and *Assm*. Those existing users wishing to upgrade can expect a discount of about 50 percent.

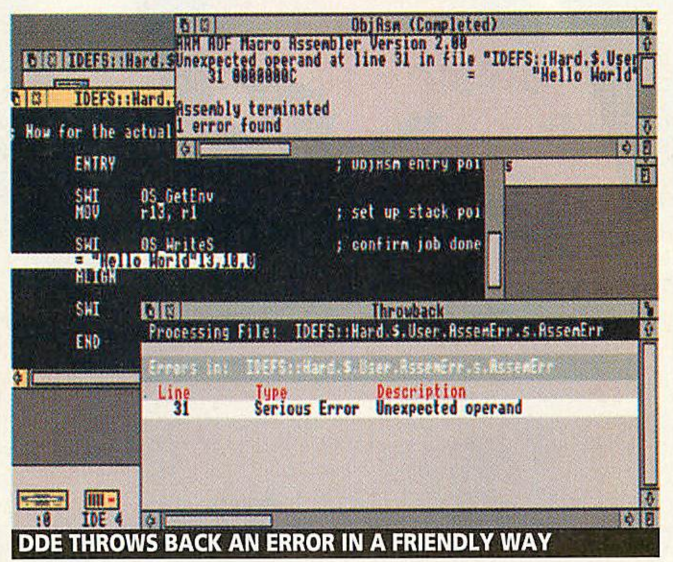
DDE is designed by Acorn to make the whole process of writing applications and modules a less time-consuming task. And by allowing programs and applications to be written entirely on the desktop it generally makes things easier and more interactive.

A manual explaining the common tools in DDE, of which there are a bewildering array, (19 in *C* and 17 in *Assembler*) comes with both packages, together with a manual specific to each package on how to use the compiler or assembler. A tuitional manual is not supplied with either package, so to actually learn how to program in C or assembler you will need to look further afield.

The packages themselves can be run from floppy disc, for the more masochistic, but are obviously at home on a hard disc. Two megabytes of memory, or preferably more, is also a necessity.

The writing of the actual source code is achieved with an enhanced version of *Edit* called *SrcEdit*. Bugs have been fixed and features, such as column tabs and overwrite mode, have been added to ease the use of the application for writing source code. Through the whole of both packages Help is a common option. Highlighting a command or directive and choosing Help will search through the selected help dictionary, which is set to the language being used, and display an explanation of what the keyword in question is used for.

SrcEdit also supports throwback in conjunction with the



DDE THROWS BACK AN ERROR IN A FRIENDLY WAY

Assembler, *ObjAsm* or the C compiler, *CC*. With this option turned on any errors detected during compilation will be listed in a window. Double clicking on one of these will bring up the source code in *SrcEdit*, with the offending line highlighted for editing. This certainly saves a great deal of time in getting rid of it.

For the more deep-rooted error that occurs after assembly or compilation then DDT, the desktop debugging tool, is a rather impressive line by line debugger. It allows debugging of pre-prepared code, except modules, at machine level. It achieves this by actually stopping the desktop and allowing steps of varying sizes to be taken through the code.

The execution can be stopped at breakpoints, and registers and memory locations can be evaluated. More useful for debugging applications, it can be stopped on a Wimp event or SWI call. Watchpoints can be set on variables and memory locations, and will tell you when they change. The position within the source code can also be displayed while debugging. DDT provides two windows, which aren't Risc Os controlled but behave as though they are.

Make is an application that provides a utility much like the sort of project management program seen on other, bigger computers. When writing large applications, several source code files may be used and *Make* simplifies the process of turning these into the object code. A makefile is a list of the commands used as a recipe to create the object code, and is created by dragging the source code files on to the *Make* window.

The beauty of a makefile is that it will only recompile or re-assemble sources which have been changed. This form of management is most useful in C but also helps with library files and common procedures.

A new version of *FormEd* is also supplied with both packages, the major difference being in the way you select windows for editing. Instead of splattering the windows all over the desktop when you load a template, they are now represented in a *Paint* style browser, and double clicking on a picon of a window will bring it up for editing.

As mentioned before many non-interactive command line tools are included to help make code more efficient, for instance, a patterns finder and a common word finder. *FrontEnd* is a module that supports all of the non-interactive tools. It provides a simple and quick interface to the wimp and allows single tasking commands and code to multi-task, much like *Edit*'s task window. The assemblers *Assm* and *ObjAssm* use this module, and so does the C compiler.

These packages present a very friendly environment for writing code in. They are obviously not for the happy hacker, but for the professional or keen amateur.

The two packages will be available at the end of August. *BAU* will be featuring full reviews of both soon.

PRODUCT DETAILS

Desktop C costs £229+VAT and the Assembler £149+VAT. Contact your local dealer for more details.

COLOURJET 132

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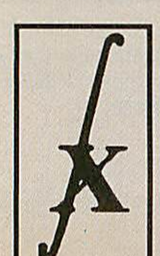
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DESIGN FOR

From medieval castles to computer logic... **CHRIS DRAGE** surveys Data

Data Designs' *Designer Castles* first appeared for the BBC B/Master 128 in 1988 and was quickly voted one of the most innovative programs of that year. Since then an Archimedes' version has followed and a sequel, *Medieval Villages* has been added.

As a departure from the medieval theme, *Designer Environment* and *Designer Logic* widen the perspective of the *Designer* series and broaden its application across the school curriculum. So what is so unique about Data Designs' approach?

The *Designer* software links a computer, printer and human ingenuity in a novel manner. Using the classroom computer, models can be designed and edited on-screen and the results printed as pieces ready for instant assembly into a 3D model with the help of scissors and glue.

The results of designing your own castle/village/environment are really very good, despite the fact that the templates are printed on standard printer paper. A variety of sizes are offered and at the construction stage problems related to mounting, painting and surface details still have to be solved. *Designer Logic* is the odd one out in that no construction results from the screen model.

This concept is not new; *Plane Designer* from Griffin & George has been available for years, permitting children to design, print and construct simple flying models which, once tested, can be modified, rebuilt and retested.

Central to the software is something that Data Designs describes as printware. Utilising a central, printer control Rom, disc-based software is developed allowing all manner of subjects to be designed, and construction pieces to be printed out – including the necessary glue tabs! Archimedes versions, however, do not require a Rom.

Designer Castles for the BBC micro was extensively reviewed in *BAU* March 1989. It is a set of materials for designing castle units and printing them out on the printer. Once assembled these models are surprisingly strong. One extra benefit is that model layouts may be saved to Campus 2000 on the Castles database so that a variety of layouts is always available for downloading. This software follows sound design principles, allowing the user to see the product from plan and elevation view. It is easy to edit and modify in response to new design constraints.

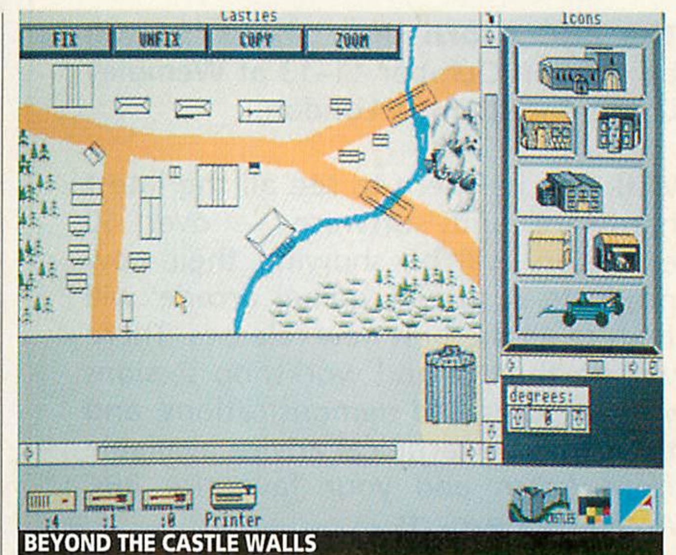
The Archimedes version improves on the BBC B in a number of ways in addition to negating the need for yet another Rom. A full wimp environment operates and the black/white BBC screen layout is replaced by a colourful Mode 12 environment. The layout in windows is both clear and logical.

IN THE MODE

Two modes are used alternately throughout the design process: The first is the icon selection mode where the various design elements such as walls, towers, keep are chosen and combined as required on an 'elevation strip' at the bottom of the screen.

In the placement mode the elements are picked up and fixed in position in plan view on the design screen. Both a gridlock and free placement are offered making alignment quite straightforward. For fine angular movements a degrees window provides accurate rotations in degrees.

At any point a wall unit can be 'unfixed' and rotated or



BEYOND THE CASTLE WALLS

deleted. Three sets of icons are offered at the design stage – the first set represents low and high walls, round and square towers and a square keep. The second set comprises a variety of inner bailey buildings, the third a variety of siege weapons. Unfortunately, the popular windows option on the BBC is not present on the current Arc version so arrow loop-holes and so on must be drawn by the children prior to construction. Square keep castles such as Rochester and curtain wall castles like Beaumaris can both be modelled using *Designer Castles*.

Designs may be saved to disc for further amendments later on. The big bonus for Archimedes owners is that in addition to all the castle icons are the complete set of village icons and drawing tools to enable coloured plans to be designed. So a castle and its neighbouring village can be drawn on the plan and all the component pieces printed out, including the plan.

The current version does not support autoscaling of the model, so only one size of model is possible at present and this cannot be placed


EDITING ON-SCREEN

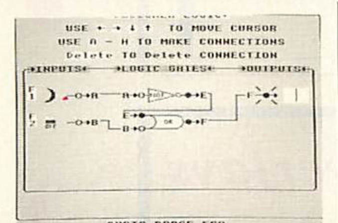
accurately onto the plan. Similarly, the 'tile' option is also missing and those huge printed plans you may have seen on the Data Design stand at the BETT Show cannot as yet be produced from the Arc version. Data Design tells me this will be implemented together with the windows option on version 1.2.

I had the opportunity to test this software with my current Year-3 class whom I had taken on a visit to Rochester to see the castle and cathedral. They reconstructed the castle as it was in 1215 AD with unparal-

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DESIGNER CASTLES: SURPRISINGLY STRONG



DESIGNER LOGIC FLOWS

leled gusto and enthusiasm. The whole model fits on a 'standard' blackboard. I was amazed at the amount of thought that took place over the proportions of the 'stonework', the relative heights of the walls and which colour to choose to ensure it all '...looked the same'.

Designer Castles prints the keep with square towers. The children were well aware of Rochester's unusual round tower built after King John's 1215 siege and were determined that this should be shown on the model. This produced more problem solving and discussion. Each item was glued to thin card to ensure that the model would have the strength to survive my class's handling of it.

The resulting construction is remarkably strong providing it is glued to a sturdy card or ply base. Measurement, estimation angles and proportion were some of the mathematical aspects to come out of *Designer Castles*.

The package supports Risc OS compatible printer drivers. I used Computer Concepts' LaserDirect printer and the whole castle/village model was printed out very speedily indeed. Two types of output are possible: The former produces the pieces ready to be cut out and assembled. Currently, these can be only in one size. A plan of the castle/village may be printed as a rough guide to construction. Unfortunately, the 2D elevation view of each wall available on the BBC B version, which permits printing of a small and simplified version of the finished castle, is not possible on the Arc version.

Designer Environment (BBC B/Master) has followed in the wake of *Castles* and is a program which permits children to create a modern environment including a range of structures from phone boxes to mosques. A plan of the district can be drawn on screen and printed out up to 2m square, on which the assembled buildings can be placed. The program follows the operation of *Medieval Villages* very closely, offering all the features of the latter program. *Designer Environment* will find a niche in many a school software library as it addresses so many areas of the curriculum: geography, history, technology, art and IT.

It is particularly relevant to the national geography curriculum where comparisons between one's own environment and another is an important aspect. Similarly, using both *Medieval Villages* and *Designer Environment* two models could be built based on medieval or tudor times and modern maps illustrating change in a particular area. An Archimedes version of this program, too, is in development.

Another Archimedes program, *Designer Logic*, directly addresses the national mathematics curriculum requirements for pupils to understand logic gates (AND, OR, NAND and so on). The program permits a screen model to be made depicting the flow from an input, such as a temperature sensor, through a logic gate to an output, like a buzzer.

EXPERIMENTAL

From using a basic AND gate to the more complex latch-type circuit, pupils can learn through experimentation at their own pace. Completed designs can be saved and printed out for work away from the computer.

The Arc version is superior to the BBC B version in terms of colour and operation but is not Risc Os compliant. Taking over the whole screen, the program looks and feels like just what it is: an Arc rewrite of a BBC B program. Data Designs assures me that a Risc Os version is on the drawing board which will permit icons to be picked up using the mouse and placed on the design.

Data Design is planning further *Designer* software, the next being *Designer Boxes* for the Archimedes series. Although only on the drawing board, *Boxes* may prove to be the most innovative member of the *Designer* series to date.

A cuboid shown in isometric oblique view may be stretched and pulled like a !Draw object with the changes being mirrored by windows each one of which contains the three angles of projection: plan, elevation and front views. Measurement tools including protractor, volume, and 'tape measure' are included, permitting accurate stretching of the shape and consistency among planned groups of shapes.

Once the final shape has been decided upon, !Draw objects or !Paint sprites can be mapped onto each or all of the surfaces. Initial plans include a cuboid shape but, with the addition of raw pyramid and cone shapes, just about any other shape can be produced, decorated, and printed out – this program would find wide applications in mathematics, science and technology.

Not only would I thoroughly recommended this software for schools but also as a Christmas gift for home computer buffs. It will keep the kids (and parents) quiet for hours!

PRODUCT DETAILS

For the BBC B, B+, Master 128
Printware ROM : £24.95
Designer Castles: £19.95
Medieval Villages: £19.95
Designer Environment: £25.00
Designer Logic: £25.00

For the Archimedes/A3000
Designer Castles: £60.00
Medieval Village: £60.00
Designer Logic : £25.00

For more information contact Data Designs, Business and Innovation Centre, Innovation Way, Barnsley, S75 1JL

Triple  Education

Picture Book

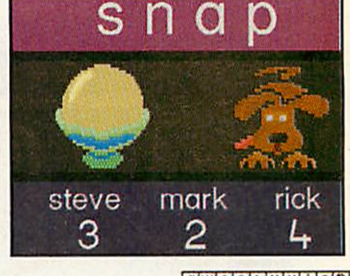
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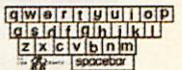
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ARCHIMEDES

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ARCHIMEDES

Money Matters comes complete with a keyboard overlay. Children can press pictures of coins rather than the computer keys

DataWord

This unique program has been designed with ease of use as a priority and fulfills many of the needs for a database in the National Curriculum. It works just like a card index but the flexibility of the text editor allows you to also use DataWord as a word processor too!
Another really powerful feature of Dataword is the built-in card linking system which means parents and teachers can create files of inter-connected cards. **THIS IS NOT JUST A DATABASE**, it's a word processor, quiz game, electronic programmed learning book and a fabulous introduction to the world of Information Technology.

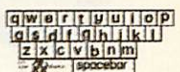
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ARCHIMEDES

Data Word comes complete with two of the revolutionary lower case keyboard overlays and FIVE fascinating example files.



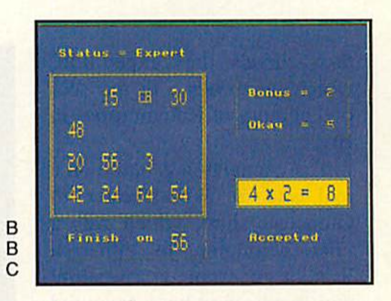
Target Maths

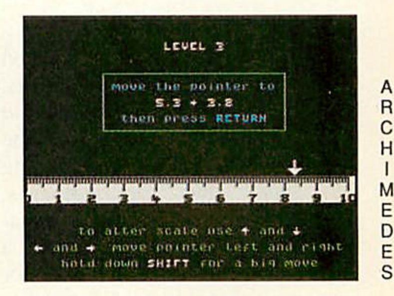
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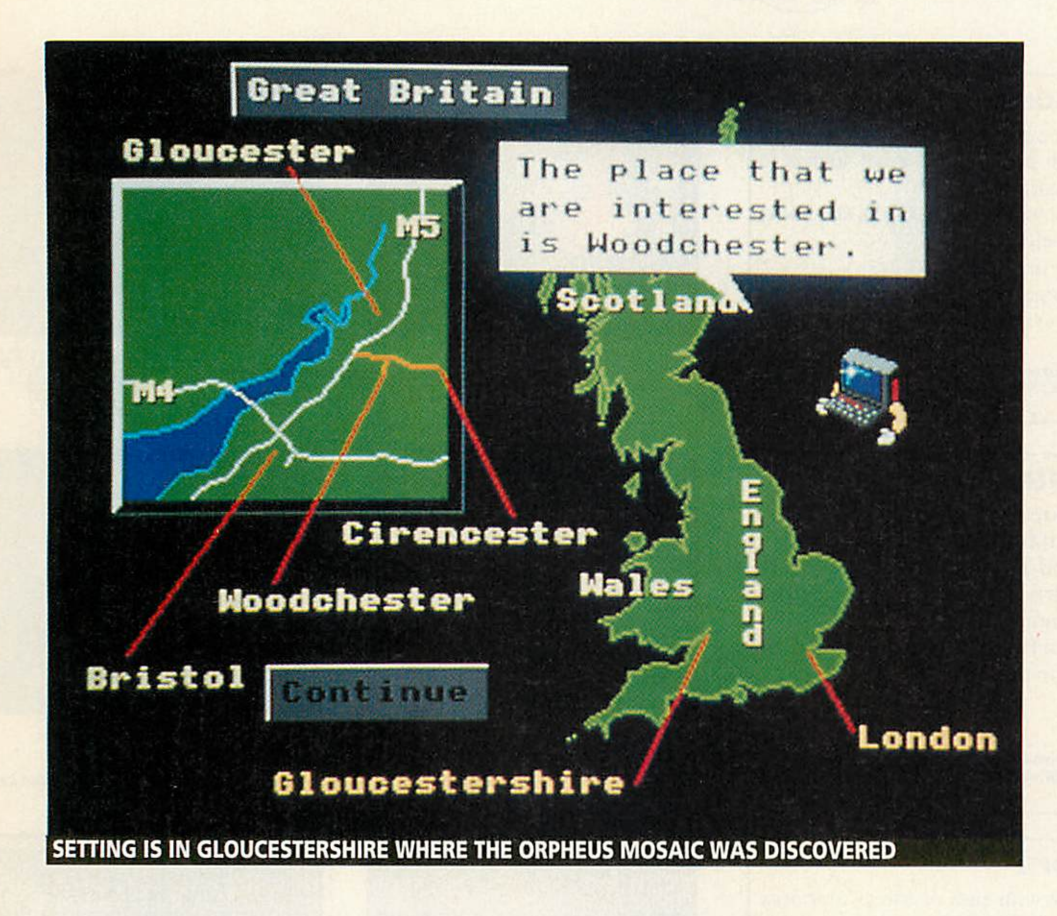
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SETTING IS IN GLOUCESTERSHIRE WHERE THE ORPHEUS MOSAIC WAS DISCOVERED

DAVE FUTCHER takes you on an archaeological adventure and unearths the value of Sherston's Arcventure software

GET DUG IN

Most people are fascinated by prehistoric monuments, Roman villas, castles and churches. Many have become intrigued by the work being done by archaeologists, especially when the newspapers cover the finding of a 13th century gold brooch or the discovery of a skeleton in a Viking burial mound.

Arcventure offers the possibility of entering that kind of world. It's an archaeological adventure into Roman times. The program was designed and written by Mark Vanstone and has been fully researched by David Warner and developed in conjunction with Steve Hartgroves, an archaeological officer from Cornwall.

There are two distinct parts to the program. First there is the 'excavation' which takes place in recent history and then there's the 'expedition' which takes place in the second century of Roman times in Britain.

The excavation is based on a real site at Woodchester in Gloucestershire, which was a villa belonging to either a Roman governor or a wealthy native who had been favoured by the Romans. It is modelled on a dig by Samuel Lyons between 1793 and 1796 which uncovered the famous Orpheus mosaic pavement.

Although *Arcventure* does not completely simulate an archaeological excavation, which is a highly complex and technical operation, it does offer a very good structured simulation, allowing anyone with a BBC A3000 or an Archimedes to search for buried artefacts by 'digging' with their computer.



SEARCH FOR BURIED ARTEFACTS WITH YOUR COMPUTER

Arcventure is a very simple program to use, and most of the program's options are controlled by a single click on the Select button, although the occasional use of Adjust is also called for. The keyboard is used for saving the current position and displaying other information.

When *Arcventure* is started for the first time, a very good introduction called the Archaeologist's Instruction option is available. This takes you through some simple steps which show how to use the excavation part of the program. In this introduction you are shown the various functions by a character called Arc 1 who takes on the form of a computer. By following Arc 1s instructions you won't have any problems finding your way around the *Arcventure* environment.

WHERE YOU DIG

After the introduction Arc 1 provides a map of Great Britain on screen and from here you are zoomed to a map of the Gloucestershire area. A click on the continue button zooms you to a three dimensional view of Woodchester village and its Priory. Another click takes you to a two dimensional view of the Priory where the excavation takes place. This on screen map is used throughout the excavation and shows where the walls of the original Roman villa were found.

The on-screen map is placed in the centre of the screen with the control panel and a three bar Choice board for selecting options, four arrows for movement and a set of tools for the excavation below the map and time and score information above.

A message window opens and you are told that you have 14 days to find out about life as it was in Roman times. Two options are initially offered. One offers help, but only tells you that there are many interesting objects to be found and that the Choice board is used to select what you want to do. The other option takes you to the information hut which is a very important feature in the whole excavation.

The information hut is the place where objects that have been found are stored. It is also the place where the archaeologists' computer is located and is used to discover more information about individual objects as they are found. Any objects collected during the dig are stored in the Objects Collected section and to get information about one of them you have to click on its name. When this has been done, the object appears in the centre of the screen and further information appears via a teletype display. For instance if you find a few pieces of leather, the message would be:

This mass of leather seems to be a boot of some kind. It is possible that it was once worn by a Roman soldier.

As well as a colour picture of the object as it was found and the written information about it, *Arcventure* offers a reconstruction facility. By clicking on this option you are provided with a reconstruction of what the object probably looked like. There is also a Cut Away option which produces a cross section of the part of the site where the object was found and the display also indicates the age of the object in relation to the age of the house.



A FIND!

DIGGING

Once the information hut has been visited you can start digging. You can choose a tool by clicking on one of the icons at the bottom right of the display. Four different tools are provided. A spade for digging quickly and crudely, a trowel for more careful digging, a brush for fine work and a magnifying glass which can be used for inspecting the ground you are working on.

Once you have chosen the tool you want to dig with, you are asked to choose where you want to dig. This is done by moving the pointer to wherever you want to dig on the map and clicking the Select button. A window will open showing a small character digging.

After a short while a message will appear on the screen telling you what your digging has uncovered. If your message is 'You see nothing but bare earth', you need to dig somewhere else. When you find an object the option bars provide three choices – Store object; Look and store; Leave object.

There is a wide range of artefacts that can be found in the archaeological simulation. These include coins, dice, a bucket, bottle, a pottery jar, a boot, a statue, fragments of a lyre and a key.

There are also six special 'unknown' artefacts which can be investigated in the 'expedition' part of the adventure. The objects have been chosen by the author to give an overall impression of life in Roman Britain, and do not totally reflect the kind or the quantity of finds from an average dig.

TIME TRAVEL

What makes *Arcventure* more than an archaeological simulation, and totally different, is its time travel dimension. Whenever the children encounter one of the 'unknown' artefacts Arc 1 opens up a window and invites them to journey back to Roman Britain via a time line to try and discover just what the artefact was used for.

This journey takes them to the Woodchester villa and parts of the Roman town of Corinium which is present day Cirencester. In the villa they can visit the main house, the bath house and the stables while in the town they enter through Gloucester Gate, and they can visit the Forum, the amphitheatre, the barracks and the Bath Gate.

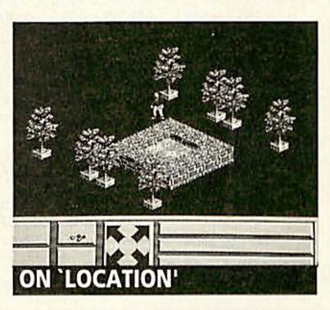
During the expedition the children can talk to any characters they meet – some tell them about aspects of Roman life while others help them find out what the mystery artefact actually is. Two expedition cards provide information on latin words, and the various characters and objects they come across and need to use during their exploration.

The expedition part of *Arcventure* is the basis for a series of very clever historical adventures. A lot of different places have to be visited and objects moved and manipulated and mysteries have to be solved.

In these adventures, aspects of Roman life become clearer and there is no doubt that this part of the program will assist in the building up of childrens' understanding of what life in Roman Britain was like.

CONCLUSIONS

Arcventure is an exciting program that provides two complementary activities. Initially the users can work in the present, joining in a dig and building up a picture of how an archaeologist would work. They can choose where to explore, pick the right tool for each part of the uncovering process, being careful not to damage any of the remains, and then experience the excitement of finding artefacts in the earth and identifying what they have found. Although obviously simplified, *Arcventure* remains a very good archaeological simulation. Its expedition dimension is the surprise. In it the children can leave twentieth century Britain and find themselves in second century Roman Britain at the entrance of a Roman villa. It's a wonderful way to experience history.


ON 'LOCATION'

There are obvious uses for *Arcventure* within schools. It will certainly be used as an important part of any work on the Romans. But anyone who wants to experience what a simplified archaeological dig would be like will also find *Arcventure* worth exploring too. Sherston Software has produced an easy to use high-quality software package that brings history alive in a rather unique way by offering an archaeological expedition into Roman times.

PRODUCT DETAILS

Arcventure costs £29.95 from Sherston Software, Swan Barton, Malmesbury, Wiltshire SN16 0LH. Tel: (0666) 840433. It is available for the Archimedes and BBC A3000 computers.

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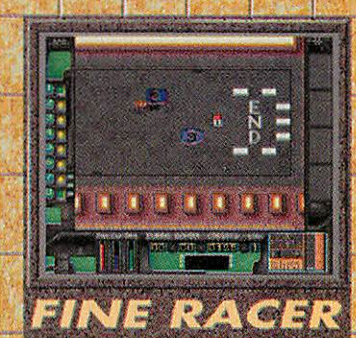






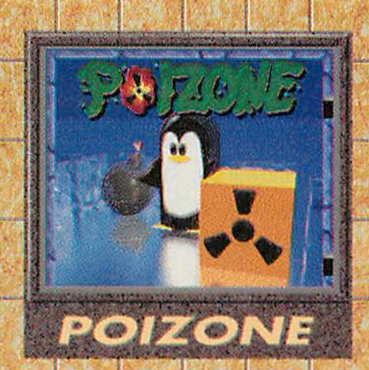














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SLIMLINE SAMPLING

Serial Port's small Econet-based sound sampler gets the once over from **PAUL JAMES**

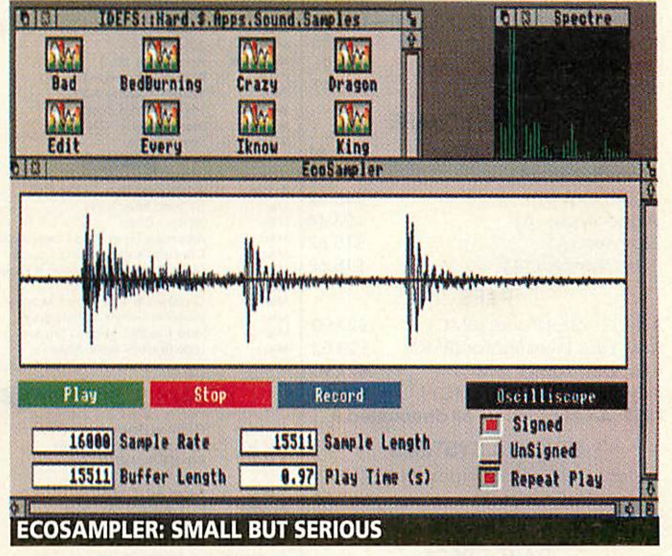
There seems to be a fad recently to plug things into the often unused Econet port on the Arc. High-speed serial links and joystick interfaces seem reasonable, but a sound sampler?

Well, the Serial Port has done it. Ecosampler is not only a sound sampler, but an Acorn standard Midi interface too, all on a board just 5x5cm, and all for around £50.

Sound sampling has a fascinating potential. Given the right software then it doesn't take much to realise how easy people like Vanilla Ice have it. Record a sound, press a few buttons, and as long as you have your Arc connected up to a decent amplifier then you'll sound just as good.

Of course sound sampling has other uses. If you write software then introducing samples into this can make a user feel much more at home. A user will immediately warm to a program that actually asks you to insert a disc, rather than throw up a box with 'Please insert disc 5' in it. Teachers have a definite use for sampling. When a child may not be that good at reading, or partially sighted, then a voice coming from the machine will make it seem far more friendly and encouraging.

The Ecosampler board itself is well-constructed. There are few components on it and it's quite nice to see that corners haven't been cut in production, which would have been easy to do with such an inexpensive product. The Econet port is used as its input and a specially built cable is supplied which has a 3mm input jack and Midi in and out leads, all of which dangle from the back of the board.



ECOSAMPLER: SMALL BUT SERIOUS

The sampler takes input from devices such as personal stereos and hi-fis, and the lead includes a section that will take a stereo input and convert it to mono. A standard 3.5mm stereo jack is supplied at the end that plugs into the source, but you can buy adaptors that fit to this that will convert it to a 5mm jack, which is commoner on older stereo systems.

My first attempt at recording a sound was completely unsuccessful, and after pulling the board out and putting it back again it decided to work. Later I found the cause was not the connection of the board but a fault in the lead supplied, which caused it to work intermittently. Rather annoying, because the only way to record a sound involves you plugging the jack into the output of the source, which in most cases cuts off all other sound.

Effectively, you record blind. So if your lead does play up then you don't know until you replay your sound through the computer. An oscilloscope option is supplied, though, which displays on screen what the sampler is receiving.

The oscilloscope option is also used to adjust the input level from the source. This can only be done by adjusting the volume of the sound coming into the sampler, so the source needs to have a volume control. Anything above 2.5V will be mercilessly cropped and will turn out as noise.

The sampling itself is done to a maximum of 250,000 samples per second on an 8-bit level, meaning that 127 is silent, with 0 and 255 being full volume. The output of a sampled sound is very good, and apart from some line noise introduced by the Arc (output sounds are filtered to death), well I couldn't tell it apart from my CD, easily. Serial Port is looking into the internal filtering problem and hopes to provide a little clip that will bypass the small piece of circuitry inside the Arc.

What is lacking is the software. I can just about understand why Serial Port has been so impatient as to release the sampler as a product now, with software that is not acceptable, but it should have been more patient. Receiving half-written software is not only disappointing but probably costs the company more in sending new versions out, therefore adding costs to the final product.

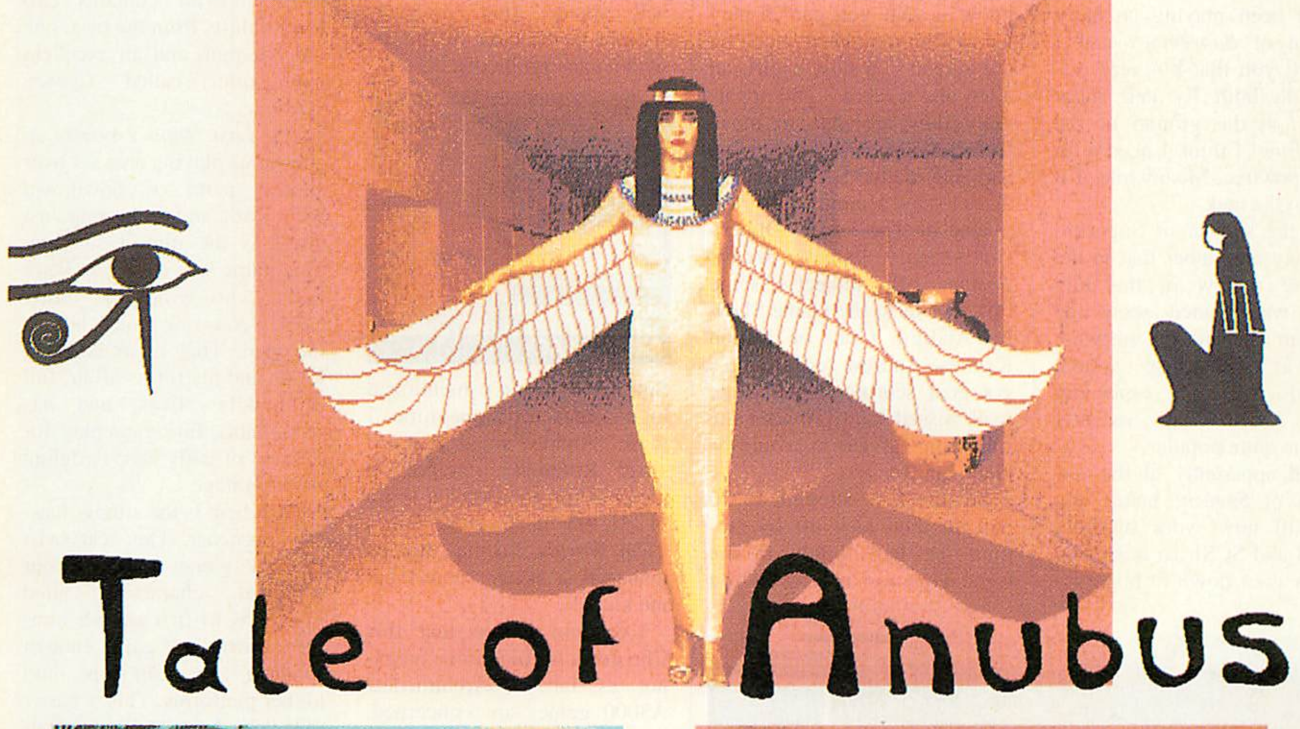
At present recording sounds is a matter of setting up an input buffer, in bytes, and sample rate. The length of the sample is displayed and clicking on the record button blanks the screen and records what's going on. Then, after a short delay your sample is displayed on the screen. Here you can reprocess it in various ways such as filtering and undersampling. This is a necessity if your sample rate isn't that high, but it does take some time to process the sample.

I was pleased with the product – it's inexpensive and effective. The software is horribly naff at the moment, but it does allow you to record, save and play back sounds. Updated versions should be available soon. Also on the disc is a small program that will patch *Armadeus* so it picks up the sampler as a podule, which of course it isn't. For Midi users a Midi echo application is included, and also a small application for future use. The Midi net will allow four computers to be connected together and multi-player games to be played. Watch this space for further developments.

PRODUCT DETAILS

The Ecosampler costs £69 from The Serial Port, Burcott Manor, Wells, Somerset, BA5 1NH Tel: (0243) 531194.

Coming to an Archimedes near you soon!









GAME SHOW

Air Supremacy is a new 32-bit game from Superior Software, and, broadly speaking, is a straight cross between *Zarch* and *Conqueror*. This is because you travel around a 3D landscape shooting at things (of course) and deciding when to change between your tank and your plane.

I've been playing an early version of *Supremacy* and I can tell you that it's very difficult to both fly and shoot things on the ground at the same time! I think I need a bit more practice. Meanwhile, I'll stick to the tank.

On the subject of Superior, you may remember that in the *Speech!* review in the July issue, we moaned about the problem of using the software with a SCSI disc system instead of ADFS, especially since SCSI has recently become quite popular.

Well, apparently, all the new copies of *Speech!* being sent out will now work on both ADFS and SCSI, so this event hereby goes down in history – a software publisher has listened to a reviewer!

Speaking of software that makes your computer talk, The Fourth Dimension recently released its speech package, *ARCticulate*. I'm looking forward to finding the differences between it and Superior *Speech!*. At the moment all I know is that you can display up to four animated faces on the screen – a boy, a girl, an alien and a robot – and apparently they are able to move their mouths in a convincing way no matter what you ask them to say! Hmmm!

One of The Fourth Dimension's early games, *Arcade Soccer*, is the subject of some tips sent in to the Game Show by Andrew Gray of Milton Keynes. Andrew reckons he's got goal scoring in the game well sussed, and provides the following advice to would-be Gary Linekers.

Set the kick strength to 70 percent then kick off by tapping the ball lightly to the right. Then run as close as you dare up the right-hand side of the pitch until just before you are level with the semi-circular marking near the goal. At this point, divert onto a diagonal path and head straight for the furthest corner of the net.

As soon as you move into the penalty area, shoot and, if you've aimed correctly, the ball should find its way straight to the back of the net without any problems.

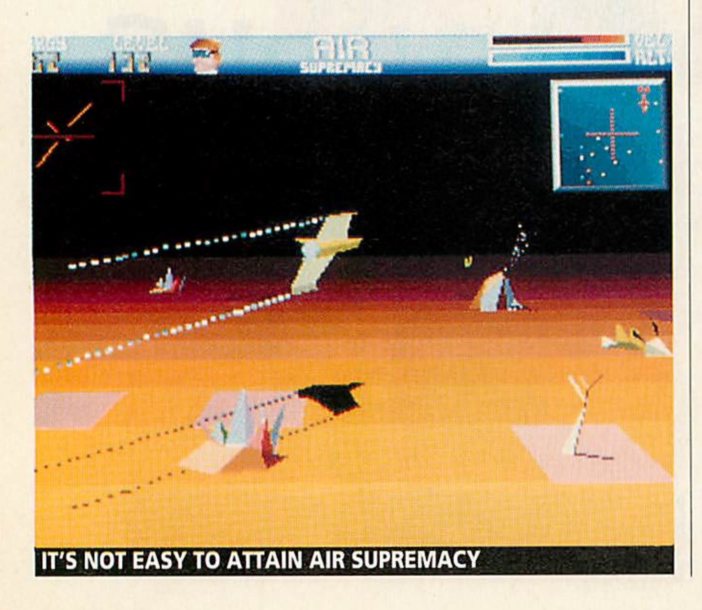

ARCTICULACY

Since we haven't mentioned high scores for some time, I think Andrew's 11-year-old sister Rosemary deserves a mention for achieving a score of 71,195 in Cygnus Soft's *Twin Worlds*. So, has anyone managed a better score? Let me know!

I've said before that this Christmas is going to be megahot as far as Archimedes/A3000 games are concerned, and one more step in this direction has recently been taken by Krisalis Software. It has announced the forthcoming release of a game called *Chuck Rock*, a title that has been enjoying success at the top of the 16-bit charts. I don't really know how to describe *Chuck Rock*, except to say that in it, you chuck rocks!

I'd like to finish this month's Game Show by wishing the computer holiday camp, Computer Park, a happy tenth anniversary in August.

Sam Greenhill



IT'S NOT EASY TO ATTAIN AIR SUPREMACY

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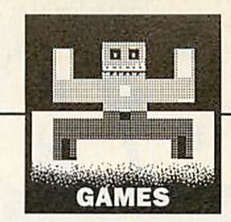
The latest Beeb compilation from Superior contains two recent blasts from the past, one old chestnut, and an excellent new title, called *Cyborg Warriors*.

The Last Ninja 2 boasts an enormous playing area set over several parts of downtown New York, and the war against drugs is the ninja's mission. This game was coded by Peter Scott, who wrote the rather elderly *Network* which is also included. This is an amusing levels and platforms affair, full of cuddly aliens, and has remarkably fine gameplay for a game of early-80s, fledgling Scott, vintage.

Also here is the simply massive *Ricochet*. The neat twist to this game is that your spherical character called Sprat has to first squash himself down to gain enough 'bounce' to leap up onto higher platforms. This is easier said than done, and is frustrating but fun.

The new game, *Cyborg Warriors*, is a real treat for all you trigger-happy shoot'em up fanatics. You just fly along through the sideways-scrolling backdrop knocking merry hell out of everyone and everything that stands in your way.

The background has five planes of silky-smooth parallax, and it gives you a real feeling of depth as you progress through the eight different thematic levels, which



range widely from forest and desert scenes to a future city and a volcanic landscape.

The game also incorporates, without a hint of flicker, large, multi-segmented, lobster-like adversaries while sustaining the background movement. Tokens can be collected to beweapon yourself beyond a standard laser, and if you have a joystick you can play with a friend. Overall, this is one of the best *Sams* so far.

Mat Tizard



RICOCHET: MASSIVE

NO EXCUSES

Arxe Systems, tel: 081-534 1198. Archimedes/A3000 £24.95

No Excuses is best described as a tactical space-invaders. The aim of the game is to rid an isometric eight by eight grid of little green nasties that hover overhead. You play the part of the Strider; a kind of two-legged blue spider that can travel around the grid, square by square.

Aliens can be destroyed by either shooting them when they are directly overhead or waiting until they've landed and then zapping them. You'll have to be quick, as the unfriendly visitors also drop bombs as they descend and fire missiles when they land.

As well as providing you with an early grave, the alien's bombs produce a number of effects when they hit the grid. Each square can be any one of 16 types. Glue bombs make squares sticky, and the Strider takes longer to cross them. Smart bombs create squares



ALL ALIENS MUST DIE!

that destroy all aliens that have already landed. One particularly useful effect is the Super square that provides the Strider with his or her own super-person outfit.

When all aliens have been destroyed, a key can be collected and the Strider can move to the next level. Fifty levels are provided as standard and for those who manage to complete these, (or for those who can't!) a level designer is included that allows you to create your own puzzles.

The designer is really easy to operate with the mouse being used to pick squares and position them on the new grid.

Graphics in the game are a simple 16-colour affair, being a direct port from the Atari ST version. The sound is similarly basic, consisting of a few, rather distorted, samples that play between levels.

No Excuses is reasonable fun because it's different to virtually anything else on the market. Once you've finished the 50 levels though, there doesn't seem much to hold your interest. The level designer helps. Rather a disappointing 'sequel' to *Rotor*.

Rob Miller

BOOGIE BUGGY

Fourth Dimension. Tel: (0742) 700661. Archimedes/A3000 £24.95

Ahhhhhhhhh! I can't stand it anymore! This has got to be *the* most irritating game I've ever played. All my muscles are strained through trying to make this stupid smiling bouncing red dodgem car bounce in the right direction and it's killing me!



NOT TOO FRIENDLY...

Sorry about that outburst; welcome to *Boogie Buggy*! Boogie's aim is to thwart evil and champion good, by collecting evil-ore and dropping it down manhole covers in Dodge City. Or at least that's what he does in the four city regions, which are quite good fun. The Ore Conversion Plants are used by some evil monster chappie to create the evil-ore, and there are four increasingly irritating OCPs to be destroyed.

The first thing you notice about Boogie is that the graphics are gorgeous. The game uses the border as well as the main screen which in fact increases the main playing area by about 40 percent and the effect is stunning. The characters are all nicely drawn and animated, and in the city regions Boogie can whizz about collecting ore, leap over the scores of creepy-crawlies and collect bonuses in a very traditional, and welcome, arcade style manner.

He can even pick up some weird extension to his 'nose' which looks like a chain saw, and slice up the creepies. Contact with creepies affects the damage meter, and at 100 percent Boogie dies, though collected plasters can patch up most of the holes.

In the OCPs the view changes from overhead to side, and Boogie has to jump from



...I'VE GOT THAT EVIL FEELING

room to room until he finds the polarity switch, then throw it and get out before the whole thing explodes.

Here's the irritating part. To move between rooms, Boogie must jump. Whenever Boogie jumps, he hits something and causes damage to himself. At 100 percent Boogie dies. Therefore Boogie dies a lot, making the whole game nigh on impossible, since all nine regions must be completed in one game, and there's no password or save game facilities.

Boogie Buggy is fun until you get into it and realise that you're likely to get very annoyed and give up long before you ever complete it. Or at least that's my experience. In summation, 'irritating'.

Sam Greenhill

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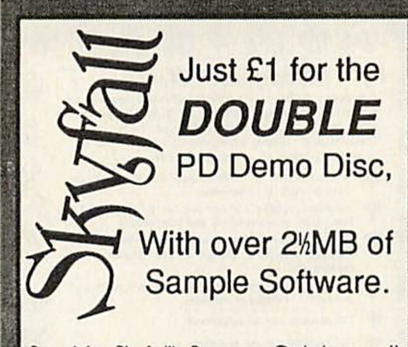
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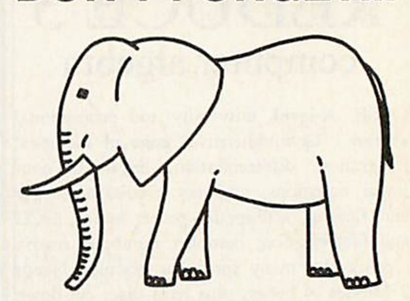
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ACORN USER ADVERTISEMENT PAGES - SEPTEMBER 1991

One Line Game - Ekans revisited!

There is good news from planet Ekans. Since our last visit, in July of this year, new research has revealed that there are five distinct types of radioactive particles. If two particles of the same type are brought into close proximity (within a strongly positive ion field) they are harmlessly neutralised. To this end, a small ion chamber has been built into the cybernetic snake. Aligning the particles is a very tricky operation and requires quick thinking and a steady hand. Particles enter the ion field from above and slowly fill the chamber. Keys '1' and '3' activate local cyclo-magnetic generators and will move the particle left and right as it falls. Once stored in the ion field, adjacent particles of similar types will be neutralised, disappearing from the chamber and thus making room for further particles. Unfortunately no one knows what happens if the chamber fills up completely!

Entering the program

We couldn't quite make the program small enough to type in on one line, so we've come up with a rather cunning alternative! Carefully type in listing 1 and run it. Now type in the actual game in Listing 2 (There are seven spaces in line 50). Now press F0. This will convert the game from a multi-line Basic program into a function key definition. Type NEW then press 1 followed by F0, and as if by magic, this will create a true one line program which can be saved in the usual way. Please keep a copy of listing 1 as you'll probably need it for future games...

```
10*KEY 0
  DIM mem 300:
  $mem="*KEY0":
  t=mem+5:
  f=PAGE:
  REPEAT:
  l=f?3-4:
  f=f+4:
  FORi=1TOl:
  b=?f:
  ?t=b:
  t=t+1:
  f=f+1:
  NEXT:
  ?t=ASC":":
  t=t-(b<>&F5):
  UNTIL f=TOP-2:
  $(t-1)="||M":
  X%=mem MOD 256:
  Y%=mem DIV 256:
  CALL &FFF7|M
```

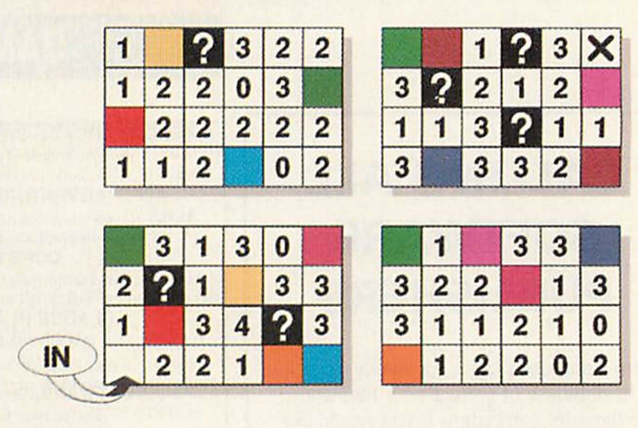
Listing 1

```
 10 MODE7
 20 e=32
 30 s=5^5
 40 VDU23;1,9
 50 PRINTSTRING$(114,
  "+")CHR$30STRING$(11,
  CHR$9+"       "+CHR$9)
 60 REPEAT
 70 x=HIMEM+RND(7)
 80 n=RND(5)+48
 90 REPEAT
100 k=VALINKEY$15
110 d=SGN(k-2)*SGNk+9
120 ?x=e
130 x=x-d*(x?d=e)
140 ?x=n
150 UNTILx?9>e
160 i=0
170 REPEAT
180 m=HIMEM+96-i
190 a=?m<48
200 b=a ORm?9>e
210 c=a OR?m<>m?1
220 m?(9+b*s)=?m
230 m?(1+c*s)=e
240 m?(-b*c*s)=e
250 i=b*c*(i+1)
260 UNTILi=96
270 UNTIL0
```

Listing 2

£25 PRIZE

Prize Puzzle



This diagram is from infamous secret agent Miss S P O'Nardge's notebook. It shows details of the interior of a secret foreign installation - obtained during previous intelligence missions. O' Nardge's task is to recover documents held in a safe in the room marked X. However, the four-storey building is heavily protected by sophisticated alarm and monitoring devices.

Equipped with the latest gadgetry O'Nardge is ready to begin her mission. In each room she has noted down the number of minutes she expects to take to disable any alarms therein. The question marks show rooms which have hitherto been impenetrable and which she must avoid. Other rooms, shown in colour, contain known secret passages through which she can safely pass. These make up her route from floor to floor and may also save her time. To help further, the organisation employing O'Nardge has a high-speed computer, which has been programmed to find her fastest route through the building to the safe and out again.

She must enter the room marked 'IN' and thereafter may move to any horizontally or vertically adjacent room. Having entered a room containing a secret passage, she must pass through that passage (to the room of the same colour) and from there to any adjacent room in the usual way. Except for 'IN' she cannot enter any room twice.

O'Nardge has found a route that will only involve 30 minutes of alarm-disabling. Did the computer calculate a quicker one? If so, how long did O'Nardge spend disabling alarms and how many rooms, counting 'IN' only once, did she enter? Send your solution (time and number of rooms) to 'September competition' at the usual address. The winner will be the sender of the first correct solution out of our hat on 31 August 1991.

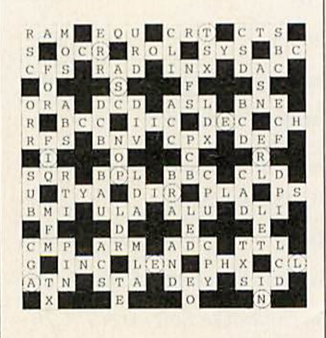
July Solutions

```
        PALER PALES MALES MILES
PAPER                              MILLS
        PIPER PIPES PILES PILES
```

John	Electron	Canon	View
Dave	Model B	Citizen	Wordwise
Peter	M128	Star	Mini Office II
Graham	Compact	Panasonic	Interword
Brian	Arc	Epson	Pipedream

July Prize Jigword solution

Congratulations to **Mr Nigel Parker** of Devon, who wins £25 for correctly solving July's abbreviations jigword. The solution is shown on the right, and the anagram we were looking for was LASER PRINTER.

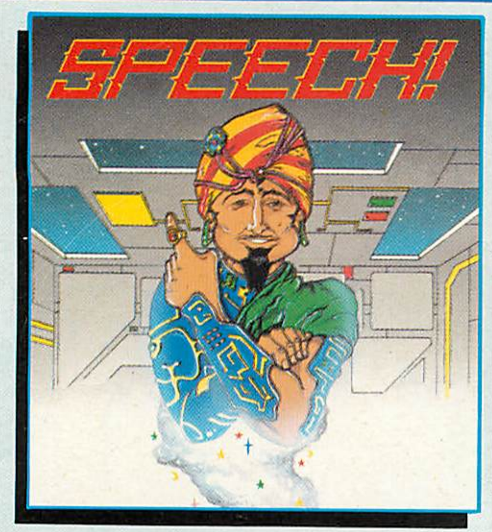


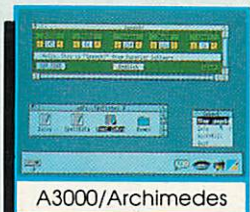
Anagram Corner

John Maxwell of Harrow earns himself a crisp fiver for the following anagrams. Can you work them out? (Hint: regular readers of the magazine will have a distinct advantage!)

- Acorn field-test crow
- Giant mob punch dad
- A wet roof surprise
- Top rate relish
- Hot cacti men
- Cement cup rots cop
- Nastier waveform
- Hedonist uniform
- Lid emitted miaow
- Rotund fly confectioner

SUPERIOR SOFTWARE




A3000/Archimedes



A3000/Archimedes

SPEECH!

Give Your Computer a Voice

SPEECH! works entirely in software, no extra hardware whatsoever is required, and has an unlimited vocabulary. The program has a built-in parser which translates English words into phonemes, so it can directly speak words you input or text files. The phonemes can be used directly if you wish, so stress and intonation can be added as required and even foreign languages can be spoken. SPEECH! includes a user-friendly spelling program, which can be easily changed to include your own words.

The new A3000/Archimedes version of SPEECH! is fully RISC OS compatible and allows multitasking in Desktop. You can vary the pitch, speed, volume, and voice, both directly and in your own text files and programs, and can even 'sing' words over a four octave range! The A3000/Archimedes version also includes a program so you can alter the dictionary yourself.

BBC Micro/Master & A3000/Archimedes

MASTER BREAK

Snooker-Style Trivia Quiz Game for 1 to 4 Players

Six categories of questions: SCIENCE & NATURE, POP MUSIC, GEOGRAPHY, SPORTS & PASTIMES, ARTS and HISTORY. Over 1500 questions in the BBC Micro/Electron version. Over 2000 questions in the A3000/Archimedes version, including digitised picture and digitised sound questions.

In the 1 player game, try to get the highest break - you might even manage the maximum break of 147. In the 2 to 4 player game, compete against your friends and family for the highest score and highest break.

Start your frame with an easy red question, then choose your colour - have you the nerve to choose the black ball question? You've used all your PASSES and the ball is OVER THE POCKET - if you miss, it's a FOUL SHOT!

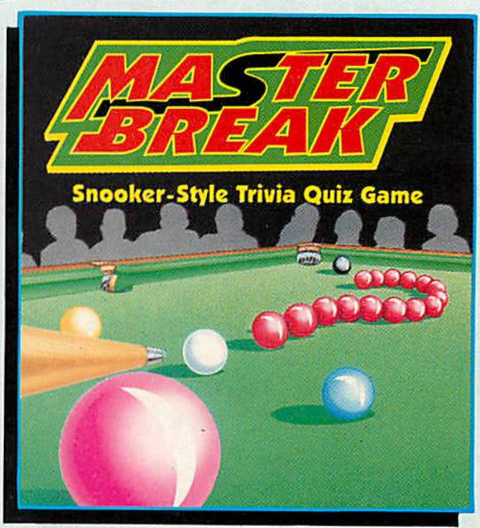
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BBC Micro/Master, Electron & A3000/Archimedes



BBC Micro/Master


A3000/Archimedes






Last Ninja 2


Cyborg Warriors

PLAY IT AGAIN SAM 15

A New Action-Packed Four-Game Compilation

LAST NINJA 2

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CYBORG WARRIORS

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NETWORK

An action-packed 'Top Ten' game by Peter Scott, featuring teleport machines, lifts, springs, strange aliens and lots, lots more. Shoot your way through more than 100 different screens as you attempt to collect the twenty parts of the 'Flynche' machine. Nerve-tingling excitement.

RICOCHET

A massive arcade adventure with brilliant graphics, as you control SPRAT, the Small Partially Robotic Alien Time-traveller. Five different levels: FORTRESS, TECHLEV, DERELICT, THE UFO and ANCIENT.

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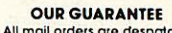
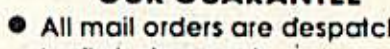
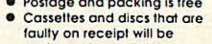
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